

EXHIBIT 6

FILE HISTORY

US 6,665,500

PATENT: 6,665,500

INVENTORS: SNAWERDT PETER

TITLE: Dual-mode fiber optic telecommunications
system and method

APPLICATION NO: US2001772018A

FILED: 29 JAN 2001

ISSUED: 16 DEC 2003

COMPILED: 12 AUG 2019

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6,665,500

**DUAL-MODE FIBER OPTIC TELECOMMUNICATIONS SYSTEM
AND METHOD**

Transaction History

Date	Transaction Description
01-29-2001	Information Disclosure Statement (IDS) Filed
01-29-2001	Information Disclosure Statement (IDS) Filed
01-29-2001	Initial Exam Team nn
02-14-2001	IFW Scan & PACR Auto Security Review
04-11-2001	Correspondence Address Change
04-30-2001	Application Dispatched from OIPE
05-02-2001	Receipt of all Acknowledgement Letters
05-17-2001	Case Docketed to Examiner in GAU
06-27-2001	Petition Entered
07-16-2001	Information Disclosure Statement (IDS) Filed
07-16-2001	Information Disclosure Statement (IDS) Filed
07-17-2001	Correspondence Address Change
07-17-2001	Mail-Petition Decision - Granted
04-29-2002	Workflow - Drawings Finished
04-29-2002	Workflow - Drawings Matched with File at Contractor
04-29-2002	New or Additional Drawing Filed
05-13-2002	Information Disclosure Statement (IDS) Filed
05-13-2002	Information Disclosure Statement (IDS) Filed
07-18-2002	Information Disclosure Statement (IDS) Filed
07-18-2002	Information Disclosure Statement (IDS) Filed
11-22-2002	Information Disclosure Statement (IDS) Filed
11-22-2002	Information Disclosure Statement (IDS) Filed
12-22-2002	Case Docketed to Examiner in GAU
02-28-2003	Case Docketed to Examiner in GAU
03-10-2003	Non-Final Rejection
03-13-2003	Mail Non-Final Rejection
06-11-2003	Response after Non-Final Action
06-16-2003	Information Disclosure Statement (IDS) Filed
06-16-2003	Information Disclosure Statement (IDS) Filed
07-02-2003	Date Forwarded to Examiner
09-08-2003	Notice of Allowance Data Verification Completed
09-08-2003	Case Docketed to Examiner in GAU
09-09-2003	Mail Notice of Allowance
09-16-2003	Dispatch to Publications
09-23-2003	Workflow - File Sent to Contractor
09-23-2003	Receipt into Pubs
09-25-2003	Issue Fee Payment Verified
09-25-2003	Issue Fee Payment Received
11-03-2003	Receipt into Pubs
11-12-2003	Application Is Considered Ready for Issue
11-14-2003	Receipt into Pubs
11-25-2003	Issue Notification Mailed
12-16-2003	Recordation of Patent Grant Mailed
12-16-2003	Patent Issue Date Used in PTA Calculation
01-10-2012	Change in Power of Attorney (May Include Associate POA)
01-10-2012	Correspondence Address Change
06-01-2015	ENTITY STATUS SET TO UNDISCOUNTED (INITIAL DEFAULT SETTING OR STATUS CHANGE)

PATENT APPLICATION



09772018

jc944 U.S. PTO

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01/29/01

INITIALS 2/27/01 12

CONTENTS

	Date Received (Incl. C. of M.) or Date Mailed	Date Received (Incl. C. of M.) or Date Mailed
1. Application <u>3</u> papers.		42. _____
2. <u>IDS</u>	<u>1290</u>	43. _____
3. <u>Pet. / Special - Accel. Exam.</u>	<u>6-27-01</u>	44. _____
4. <u>Supplement to Pet. Mktg. Special</u>	<u>7-11-01</u>	45. _____
5. <u>Change of Address</u>	<u>7-11-01</u>	46. _____
6. <u>Decision - Granted</u>	<u>7-17-01</u>	47. _____
7. <u>I.D.S.</u>	<u>7.16.01</u>	48. _____
8. <u>Formel</u>	<u>4.29.02</u>	49. _____
9. <u>Supp. IDS w/Ref.</u>	<u>7.1.02</u>	50. _____
10. <u>Supp. IDS w/Ref.</u>	<u>7-18-02</u>	51. _____
11. <u>Supp. IDS w/Ref.</u>	<u>11-22-02</u>	52. _____
12. <u>Amendment (3 pages)</u>	<u>3-17-03</u>	53. _____
13. <u>Amendment</u>	<u>6/11/03</u>	54. _____
14. <u>Supp. IDS w/Ref</u>	<u>6-16-03 (5 new)</u>	55. _____
15. <u>Notice of Allow</u>	<u>9/19/03</u>	56. _____
16. <u>Amendment</u>	<u>4/29/02</u>	57. _____
17. _____		58. _____
18. _____		59. _____
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ISSUE SLIP STAPLE AREA (for additional cross references)

POSITION	INITIALS	ID	DATE
FEE DETERMINATION			
O.I.P.E. CLASSIFIER		48	2/27/01
FORMALITY REVIEW	LCK	1034	4-27-01
RESPONSE FORMALITY REVIEW			

INDEX OF CLAIMS

✓ Rejected N Non-elected
 = Allowed I Interference
 - (Through numeral)... Canceled A Appeal
 ÷ Restricted O Objected

Claim	Date
Final Original	
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If more than 150 claims or 10 actions
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L Number	Hits	Search Text	DB	Time stamp
1	248	398/202.ccls.	USPAT	2003/09/05 09:19
2	19	interferometer\$1 and 398/202.ccls.	USPAT	2003/09/05 09:20
4	166	398/203,204.ccls.	USPAT	2003/09/05 09:20
5	20	interferometer\$1 and 398/203,204.ccls.	USPAT	2003/09/05 09:20
6	407	398/202.ccls. or 398/203,204.ccls.	USPAT	2003/09/05 09:20
7	130	(398/202.ccls. or 398/203,204.ccls.) and (phase same (amplitude or intensity))	USPAT	2003/09/05 09:20

Search History 9/5/03 9:21:11 AM Page 1

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L Number	Hits	Search Text	DB	Time stamp
31	2	("6215565").PN.	USPAT; EPO; JPO; DERWENT	2003/03/09 17:28
32	2	("5483370").PN.	USPAT; EPO; JPO; DERWENT	2003/03/09 17:28
-	12526	phase adj modulat\$4	USPAT	2001/07/25 14:01
-	20402	amplitude adj modulat\$4	USPAT	2001/07/25 13:31
-	2715	(phase adj modulat\$4) same (amplitude adj modulat\$4)	USPAT	2001/07/25 13:41
-	1107	((phase adj modulat\$4) same (amplitude adj modulat\$4)) and optic\$4	USPAT	2001/07/25 13:31
-	2101	(phase adj modulat\$4) with (amplitude adj modulat\$4)	USPAT	2001/07/25 13:31
-	842	((phase adj modulat\$4) with (amplitude adj modulat\$4)) and optic\$4	USPAT	2001/07/25 13:32
-	232	((phase adj modulat\$4) with (amplitude adj modulat\$4)) same transmitter	USPAT	2001/07/25 13:31
-	56	((phase adj modulat\$4) with (amplitude adj modulat\$4)) same transmitter) and optic\$4	USPAT	2001/07/25 13:35
-	108	332/145.ccls.	USPAT	2001/07/25 13:35
-	3	optic\$4 and 332/145.ccls.	USPAT	2001/07/25 13:37
-	142	332/144.ccls.	USPAT	2001/07/25 13:37
-	98	332/149.ccls.	USPAT	2001/07/25 13:37
-	10	332/144.ccls. and 332/149.ccls.	USPAT	2001/07/25 13:37
-	6371	359/109-195.ccls.	USPAT	2001/07/25 13:45
-	197	((phase adj modulat\$4) same (amplitude adj modulat\$4)) and 359/109-195.ccls.	USPAT	2001/07/25 13:45
-	132	((phase adj modulat\$4) same (amplitude adj modulat\$4)) and 359/109-195.ccls.) and transmitter\$1	USPAT	2001/07/25 13:48
-	429	359/181.ccls.	USPAT	2001/07/25 13:48
-	42	((phase adj modulat\$4) same (amplitude adj modulat\$4)) and 359/181.ccls.	USPAT	2001/07/25 13:48
-	203	(phase adj modulator) same (amplitude adj modulator)	USPAT	2001/07/25 14:01
-	26	((phase adj modulator) same (amplitude adj modulator)) and 359/109-195.ccls.	USPAT	2001/07/25 14:01
-	14	((phase adj modulator) same (amplitude adj modulator)) and 359/109-195.ccls.) not ((phase adj modulat\$4) same (amplitude adj modulat\$4)) and 359/181.ccls.)	USPAT	2001/07/25 14:09
-	1308	359/180-188.ccls.	USPAT	2001/07/25 14:10
-	2162	modulators with switch\$4	USPAT	2001/07/25 14:27
-	38	359/180-188.ccls. and (modulators with switch\$4)	USPAT	2001/07/25 14:10
-	1049	modulators with select\$4	USPAT	2001/07/25 14:27
-	27	(modulators with select\$4) and 359/180-188.ccls.	USPAT	2001/07/25 14:27

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-	90	((phase adj modulats4) same (amplitude adj modulats4)) and 359/181.ccls.) or ((phase adj modulator) same (amplitude adj modulator)) and 359/109-195.ccls.) or (((phase adj modulator) same (amplitude adj modulator)) and 359/109-195.ccls.) not ((phase adj modulats4) same (amplitude adj modulats4)) and 359/181.ccls.) or (359/180-188.ccls. and (modulators with switch\$4))	USPAT	2001/07/25 14:28
-	16	((modulators with select\$4) and 359/180-188.ccls.) not (((phase adj modulats4) same (amplitude adj modulats4)) and 359/181.ccls.) or ((phase adj modulator) same (amplitude adj modulator)) and 359/109-195.ccls.) or (((phase adj modulator) same (amplitude adj modulator)) and 359/109-195.ccls.) not ((phase adj modulats4) same (amplitude adj modulats4)) and 359/181.ccls.) or (359/180-188.ccls. and (modulators with switch\$4)))	USPAT	2001/07/25 14:28
-	26	(US "5694094" A US "6259836" B1 US "6256127" B1 US "6130767" A US "6124960" A US "6122086" A US "5999300" A US "5946119" A US "5880870" A US "5828478" A US "5699179" A US "5691832" A US "5420868" A US "5373382" A US "4912526" A US "4893353" A US "4408354" A US "6134033" A US "5910852" A US "5477375" A US "5473460" A US "4468766" A US "6097525" A US "5394261" A US "5339183" A US "3956626" A) .pn.	USPAT	2001/07/25 14:41

	25	((US "5694094" A US "6259836" B1 US "6256127" B1 US "6130767" A US "6124960" A US "6122086" A US "5999300" A US "5946119" A US "5880870" A US "5828478" A US "5699179" A US "5691832" A US "5420868" A US "5373382" A US "4912526" A US "4893353" A US "4408354" A US "6134033" A US "5910852" A US "5477375" A US "5473460" A US "4468766" A US "6097525" A US "5394261" A US "5339183" A US "3956626" A .pn.) and {(amplitude or intensity) and phase)	USPAT	2001/07/25 14:51
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-	1	((US "5694094" A US "6259836" B1 US "6256127" B1 US "6130767" A US "6124960" A US "6122086" A US "5999300" A US "5946119" A US "5880870" A US "5828478" A US "5699179" A US "5691832" A US "5420868" A US "5373382" A US "4912526" A US "4893353" A US "4408354" A US "6134033" A US "5910852" A US "5477375" A US "5473460" A US "4468766" A US "6097525" A US "5394261" A US "5339183" A US "3956626" A) .pn.) not ((US "5694094" A US "6259836" B1 US "6256127" B1 US "6130767" A US "6124960" A US "6122086" A US "5999300" A US "5946119" A US "5880870" A US "5828478" A US "5699179" A US "5691832" A US "5420868" A US "5373382" A US "4912526" A US "4893353" A US "4408354" A US "6134033" A US "5910852" A US "5477375" A US "5473460" A US "4468766" A US "6097525" A US "5394261" A US "5339183" A US "3956626" A) .pn.) and ((amplitude or intensity) and phase))	USPAT	2001/07/25 14:51
-	154	(370/204).CCLS.	USPAT	2001/07/26 11:37
-	12	3737776.URPN.	USPAT	2001/07/26 09:35
-	154	(370/204).CCLS.	USPAT	2001/07/26 11:37
-	61	((370/204).CCLS.) and switch\$4	USPAT	2001/07/26 11:38
-	42	((370/204).CCLS.) and switch\$4) and phase and amplitude	USPAT	2001/07/26 11:46
-	19	((370/204).CCLS.) and switch\$4) and (phase adj modul\$4) and (amplitude adj modulat\$4)	USPAT	2001/07/26 12:02
-	3	("3611209" "3697892" "3828279").PN.	USPAT	2001/07/26 12:01
-	18	3987374.URPN.	USPAT	2001/07/26 12:01

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-	18	{multi-mode or multimode or dual-mode or (dual adj mode)) adj modulator\$1	USPAT	2002/06/25
-	14	{(multi-mode or multimode or dual-mode or (dual adj mode)) adj modulator\$1) and phase	USPAT	12:04
-	7	{{(multi-mode or multimode or dual-mode or (dual adj mode)) adj modulator\$1) and phase) and amplitude	USPAT	2001/07/26
-	19	3987374.URPN.	USPAT	12:13
-	6	("3787785" "3958191" "3987374" "4404532" "4442530" "4504802").PN.	USPAT	2002/06/25
-	3	("3617889" "3697892" "3816657").PN.	USPAT	08:28
-	17	3958191.URPN.	USPAT	2002/06/25
-	65	{multi-mode or multimode or dual-mode or (dual adj mode)) adj transmitter\$1	USPAT	08:50
-	1572	(time adj division) and (phase with modulat\$4) and (amplitude with modulat\$4)	USPAT	2002/06/25
-	33	359/135-140.ccls. and (time adj division) and (phase with modulat\$4) and (amplitude with modulat\$4))	USPAT	09:00
-	15	hait-john-\$in.	USPAT	2002/06/25
-	28	{"4103238" "4267591" "4281412" "4485357" "4737968" "5093848" "5136616" "5191597" "5222103" "5331666" "5335250" "5462355" "5491457" "5491832" "5557645" "5559788" "5568518" "5577068" "5577087" "5602868" "5612651" "5615231" "5619553" "5629956" "5671253" "5678183" "5694433" "5784412").PN.	USPAT	09:47
-	7	{"5124672" "5179360" "5249302" "5291516" "5422931" "5428664" "5446421").PN.	USPAT	2002/06/25
-	27	5577087.URPN.	USPAT	09:59
-	57	5291516.URPN.	USPAT	2002/06/25
-			USPAT	10:15
-			USPAT	2002/06/25
-			USPAT	10:37

61	(US "6124960" A US "6134033" A US "5946119" A US "6122086" A US "5910852" A US "5477375" A US "6097525" A US "5339183" A US "3987374" A US "5748678" A US "4955083" A US "4584540" A US "3958191" A US "6281748" B1 US "6185259" B1 US "5428664" A US "5422931" A US "5249302" A US "5179360" A US "5602868" A US "5577087" A US "6192070" B1 US "5771442" A US "5291516" A US "5880870" A US "5373382" A US "5694094" A US "6259836" B1 US "6256127" B1 US "6130767" A US "5699179" A US "5691832" A US "5473460" A US "5828478" A US "5999300" A US "4408354" A US "4912526" A US "4893353" A US "4468766" A US "5394261" A US "3956626" A US "5420868" A US "4381560" A US "4379947" A US "4206320" A US "4217467" A US "3737776" A US "3366882" A US "3406343" A US "3499995" A US "3553367" A US "3160812" A US "3260964" A US "3178515" A US "3188573" A US "2619547" A US "2582968" A US "2611826" A US "2662116" A US "6256124" B1 US "5678183" A) .pn.	USPAT	2002/06/25 10:40
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-	26	((US "6124960" A US "6134033" A US "5946119" A US "6122086" A US "5910852" A US "5477375" A US "6097525" A US "5339183" A US "3987374" A US "5748678" A US "4955083" A US "4584540" A US "3958191" A US "6281748" B1 US "6185259" B1 US "5428664" A US "5422931" A US "5249302" A US "5179360" A US "5602868" A US "5577087" A US "6192070" B1 US "5771442" A US "5291516" A US "5880870" A US "5373382" A US "5694094" A US "6259836" B1 US "6256127" B1 US "6130767" A US "5699179" A US "5691832" A US "5473460" A US "5828478" A US "5999300" A US "4408354" A US "4912526" A US "4893353" A US "4468766" A US "5394261" A US "3956626" A US "5420868" A US "4381560" A US "4379947" A US "4206320" A US "4217467" A US "3737776" A US "3366882" A US "3406343" A US "3499995" A US "3553367" A US "3160812" A US "3260964" A US "3178515" A US "3188573" A US "2619547" A US "2582968" A US "2611826" A US "2662116" A US "6256124" B1 US "5678183" A).pn.) and (fiber\$1 or optic\$4)	USPAT	2002/06/25 10:40
-	187	(multi-mode or multimode or dual-mode or (dual adj mode)) with modulator\$1	USPAT	2002/06/25 12:09
-	273	(multi-mode or multimode or dual-mode or (dual adj mode)) with modulator\$1	USPAT; EPO; JPO; DERWENT	2002/06/25 12:19
-	14736	359/109-195.ccls.	USPAT; EPO; JPO; DERWENT	2002/06/25 12:10

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-	18	((multi-mode or multimode or dual-mode or (dual adj mode)) with modulator\$1) and 359/109-195.ccls.	USPAT; EPO; JPO; DERWENT	2002/06/25 12:10
-	337	(multi-mode or dual-mode or (dual adj mode)) with transmitter\$1	USPAT; EPO; JPO; DERWENT	2002/06/25 12:20
-	19	((multi-mode or dual-mode or (dual adj mode)) with transmitter\$1) and 359/109-195.ccls.	USPAT; EPO; JPO; DERWENT	2002/06/25 12:18
-	15	((multi-mode or dual-mode or (dual adj mode)) with transmitter\$1) and 359/109-195.ccls.) not ((multi-mode or multimode or dual-mode or (dual adj mode)) with modulator\$1) and 359/109-195.ccls.)	USPAT; EPO; JPO; DERWENT	2002/06/25 12:18
-	172	359/183.ccls.	USPAT; EPO; JPO; DERWENT	2002/06/25 12:20
-	577	interferometer and 359/109-195.ccls.	USPAT; EPO; JPO; DERWENT	2002/06/25 15:52
-	264	(interferometer same phase) and 359/109-195.ccls.	USPAT; EPO; JPO; DERWENT	2002/06/25 15:53
-	19	(US "6124960" A US "6134033" A US "5946119" A US "6122086" A US "5880870" A US "5373382" A US "5694094" A US "5910852" A US "5699179" A US "5473460" A US "5828478" A US "5999300" A US "4912526" A US "4893353" A US "5477375" A US "4468766" A US "6097525" A US "5394261" A US "5420868" A) .pn.	USPAT	2002/06/25 16:04
-	6	interferometer and ((US "6124960" A US "6134033" A US "5946119" A US "6122086" A US "5880870" A US "5373382" A US "5694094" A US "5910852" A US "5699179" A US "5473460" A US "5828478" A US "5999300" A US "4912526" A US "4893353" A US "5477375" A US "4468766" A US "6097525" A US "5394261" A US "5420868" A) .pn.)	USPAT	2002/06/25 16:09
-	6583	359/237-324.ccls.	USPAT	2002/06/25 16:11
-	7019	359/109-195.ccls.	USPAT	2002/06/25 16:11
-	13303	359/237-324.ccls. or 359/109-195.ccls.	USPAT	2002/06/25 16:11

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-	5	{359/237-324.ccls. or 359/109-195.ccls.} and {(standby or backup or back-up or stand-by) with modulator\$1}	USPAT	2002/06/25 16:19
-	275	359/276.ccls.	USPAT; EPO; JPO; DERWENT	2002/06/25 16:20
-	208	359/279.ccls.	USPAT; EPO; JPO; DERWENT	2002/06/25 16:20
-	17	359/276.ccls. and 359/279.ccls.	USPAT; EPO; JPO; DERWENT	2002/06/25 16:28
-	5248	optic\$4 and {(phase with modulat\$4) same (amplitude with modulat\$4)}	USPAT; EPO; JPO; DERWENT	2002/06/25 16:32
-	3394	{(phase with modulat\$4) same (amplitude with modulat\$4) same (switch\$4 or select\$4)}	USPAT; EPO; JPO; DERWENT	2002/06/25 16:32
-	999	optic\$4 and {(phase with modulat\$4) same (amplitude with modulat\$4) same (switch\$4 or select\$4)}	USPAT; EPO; JPO; DERWENT	2002/06/25 16:32
-	14736	359/109-195.ccls.	USPAT; EPO; JPO; DERWENT	2002/06/25 16:33
-	105	359/109-195.ccls. and (optic\$4 and {(phase with modulat\$4) same (amplitude with modulat\$4) same (switch\$4 or select\$4)})	USPAT; EPO; JPO; DERWENT	2002/06/26 07:20
-	18	{("5822102") or ("4754452") or ("5946119") or ("5940452") or ("5920416") or ("5291516") or ("5239306") or ("6243505") or ("5726784") or ("5793512") or ("5896211") or ("6097525") or ("6256130") or ("5543952") or ("5223967") or ("5606446") or ("5455698") or ("6072615"))}.PN.	USPAT	2002/06/27 15:19
-	0	halbert-lasalle.in.	USPAT; EPO; JPO; DERWENT	2002/06/27 15:16
-	0	halbert-lasalle-\$.in.	USPAT; EPO; JPO; DERWENT	2002/06/27 15:17
-	0	halbert-lasalle	USPAT; EPO; JPO; DERWENT	2002/06/27 15:17
-	0	{halbert and lasalle}.in.	USPAT; EPO; JPO; DERWENT	2002/06/27 15:18
-	319	{halbert}.in.	USPAT; EPO; JPO; DERWENT	2002/06/27 15:19
-	119	{lasalle}.in.	USPAT; EPO; JPO; DERWENT	2002/06/27 15:18
-	0	{(halbert).in.} and {(lasalle).in.}	USPAT; EPO; JPO; DERWENT	2002/06/27 15:18
-	21	1999.py. and {(halbert).in.}	USPAT; EPO; JPO; DERWENT	2002/06/27 15:19
-	19	{("5822102") or ("4754452") or ("5946119") or ("5940452") or ("5920416") or ("5291516") or ("5239306") or ("6243505") or ("5726784") or ("5793512") or ("5896211") or ("6097525") or ("6256130") or ("5543952") or ("5223967") or ("5606446") or ("5455698") or ("6072615") or ("RE36430"))}.PN.	USPAT	2002/06/27 16:12
-	3	{("3699463") or ("3975628") or ("5991477"))}.PN.	USPAT	2002/06/27 16:12

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46	leung-christina-\$.xa.	USPAT; EPO; JPO; DERWENT	2002/10/01 09:27
2	wo-9631025-\$.did.	USPAT; EPO; JPO; DERWENT	2002/10/01 14:52
63	(US-5771442-\$. or US-6281748-\$. or US-6185259-\$. or US-4381560-\$. or US-4379947-\$. or US-4217467-\$. or US-4206320-\$. or US-3987374-\$. or US-3737776-\$. or US-3406343-\$. or US-3499995-\$. or US-3553367-\$. or US-3366882-\$. or US-3160812-\$. or US-3188573-\$. or US-3260964-\$. or US-3178515-\$. or US-2619547-\$. or US-2582968-\$. or US-2662116-\$. or US-2611826-\$. or US-5748678-\$. or US-4955083-\$. or US-4584540-\$. or US-3958191-\$. or US-5678183-\$.).did. or (US-5577087-\$. or US-5602868-\$. or US-6256124-\$. or US-6124960-\$. or US-6134033-\$. or US-6122086-\$. or US-5946119-\$. or US-5880870-\$. or US-5373382-\$. or US-5694094-\$. or US-6259836-\$. or US-6256127-\$. or US-6130767-\$. or US-5910852-\$. or US-5691832-\$. or US-5699179-\$. or US-5473460-\$. or US-5420868-\$. or US-5422772-\$. or US-5291516-\$. or US-5999300-\$. or US-5828478-\$. or US-4912526-\$. or US-4408354-\$. or US-4893353-\$. or US-5428664-\$. or US-6097525-\$.).did. or (US-5917628-\$. or US-5339183-\$. or US-5394261-\$. or US-3956626-\$. or US-5249302-\$. or US-5422931-\$. or US-5179360-\$. or US-6192070-\$. or US-5477375-\$. or US-4468766-\$.).did. 45 ((US-5771442-\$. or US-6281748-\$. or US-6185259-\$. or US-4381560-\$. or US-4379947-\$. or US-4217467-\$. or US-4206320-\$. or US-3987374-\$. or US-3737776-\$. or US-3406343-\$. or US-3499995-\$. or US-3553367-\$. or US-3366882-\$. or US-3160812-\$. or US-3188573-\$. or US-3260964-\$. or US-3178515-\$. or US-2619547-\$. or US-2582968-\$. or US-2662116-\$. or US-2611826-\$. or US-5748678-\$. or US-4955083-\$. or US-4584540-\$. or US-3958191-\$. or US-5678183-\$.).did. or (US-5577087-\$. or US-5602868-\$. or US-6256124-\$. or US-6124960-\$. or US-6134033-\$. or US-6122086-\$. or US-5946119-\$. or US-5880870-\$. or US-5373382-\$. or US-5694094-\$. or US-6259836-\$. or US-6256127-\$. or US-6130767-\$. or US-5910852-\$. or US-5691832-\$. or US-5699179-\$. or US-5473460-\$. or US-5420868-\$. or US-5422772-\$. or US-5291516-\$. or US-5999300-\$. or US-5828478-\$. or US-4912526-\$. or US-4408354-\$. or US-4893353-\$. or US-5428664-\$. or US-6097525-\$.).did. or (US-5917628-\$. or US-5339183-\$. or US-5394261-\$. or US-3956626-\$. or US-5249302-\$. or US-5422931-\$. or US-5179360-\$. or US-6192070-\$. or US-5477375-\$. or US-4468766-\$.).did.) and (phase with modulat\$4)	USPAT; EPO; JPO; DERWENT	2002/10/03 08:32

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-	45	((US-5771442-\$ or US-6281748-\$ or US-6185259-\$ or US-4381560-\$ or US-4379947-\$ or US-4217467-\$ or US-4206320-\$ or US-3987374-\$ or US-3737776-\$ or US-3406343-\$ or US-3499995-\$ or US-3553367-\$ or US-3366882-\$ or US-3160812-\$ or US-3188573-\$ or US-3260964-\$ or US-3178515-\$ or US-2619547-\$ or US-2582968-\$ or US-2662116-\$ or US-2611826-\$ or US-5748678-\$ or US-4955083-\$ or US-4584540-\$ or US-3958191-\$ or US-5678183-\$).did. or (US-5577087-\$ or US-5602868-\$ or US-6256124-\$ or US-6124960-\$ or US-6134033-\$ or US-6122086-\$ or US-5946119-\$ or US-5880870-\$ or US-5373382-\$ or US-5694094-\$ or US-6259836-\$ or US-6256127-\$ or US-6130767-\$ or US-5910852-\$ or US-5691832-\$ or US-5699179-\$ or US-5473460-\$ or US-5420868-\$ or US-5422772-\$ or US-5291516-\$ or US-5999300-\$ or US-5828478-\$ or US-4912526-\$ or US-4408354-\$ or US-4893353-\$ or US-5428664-\$ or US-6097525-\$).did. or (US-5917628-\$ or US-5339183-\$ or US-5394261-\$ or US-3956626-\$ or US-5249302-\$ or US-5422931-\$ or US-5179360-\$ or US-6192070-\$ or US-5477375-\$ or US-4468766-\$).did.) and ((intensity or amplitude) with modulats\$)	USPAT; EPO; JPO; DERWENT	2002/10/03 10:51
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42	<p>((US-5771442-\$ or US-6281748-\$ or US-6185259-\$ or US-4381560-\$ or US-4379947-\$ or US-4217467-\$ or US-4206320-\$ or US-3987374-\$ or US-3737776-\$ or US-3406343-\$ or US-3499995-\$ or US-3553367-\$ or US-3366882-\$ or US-3160812-\$ or US-3188573-\$ or US-3260964-\$ or US-3178515-\$ or US-2619547-\$ or US-2582968-\$ or US-2662116-\$ or US-2611826-\$ or US-5748678-\$ or US-4955083-\$ or US-4584540-\$ or US-3958191-\$ or US-5678183-\$).did. or (US-5577087-\$ or US-5602868-\$ or US-6256124-\$ or US-6124960-\$ or US-6134033-\$ or US-6122086-\$ or US-5946119-\$ or US-5880870-\$ or US-5373382-\$ or US-5694094-\$ or US-6259836-\$ or US-6256127-\$ or US-6130767-\$ or US-5910852-\$ or US-5691832-\$ or US-5699179-\$ or US-5473460-\$ or US-5420868-\$ or US-5422772-\$ or US-5291516-\$ or US-5999300-\$ or US-5828478-\$ or US-4912526-\$ or US-4408354-\$ or US-4893353-\$ or US-5428664-\$ or US-6097525-\$).did. or (US-5917628-\$ or US-5339183-\$ or US-5394261-\$ or US-3956626-\$ or US-5249302-\$ or US-5422931-\$ or US-5179360-\$ or US-6192070-\$ or US-5477375-\$ or US-4468766-\$).did.) and (phase with modulat\$4)) and ((US-5771442-\$ or US-6281748-\$ or US-6185259-\$ or US-4381560-\$ or US-4379947-\$ or US-4217467-\$ or US-4206320-\$ or US-3987374-\$ or US-3737776-\$ or US-3406343-\$ or US-3499995-\$ or US-3553367-\$ or US-3366882-\$ or US-3160812-\$ or US-3188573-\$ or US-3260964-\$ or US-3178515-\$ or US-2619547-\$ or US-2582968-\$ or US-2662116-\$ or US-2611826-\$ or US-5748678-\$ or US-4955083-\$ or US-4584540-\$ or US-3958191-\$ or US-5678183-\$).did. or (US-5577087-\$ or US-5602868-\$ or US-6256124-\$ or US-6124960-\$ or US-6134033-\$ or US-6122086-\$ or US-5946119-\$ or US-5880870-\$ or US-5373382-\$ or US-5694094-\$ or US-6259836-\$ or US-6256127-\$ or US-6130767-\$ or US-5910852-\$ or US-5691832-\$ or US-5699179-\$ or US-5473460-\$ or US-5420868-\$ or US-5422772-\$ or US-5291516-\$ or US-5999300-\$ or US-5828478-\$ or US-4912526-\$ or US-4408354-\$ or US-4893353-\$ or US-5428664-\$ or US-6097525-\$).did. or (US-5917628-\$ or US-5339183-\$ or US-5394261-\$ or US-3956626-\$ or US-5249302-\$ or US-5422931-\$ or US-5179360-\$ or US-6192070-\$ or US-5477375-\$ or US-4468766-\$).did.) and ((intensity or amplitude) with modulat\$4))</p>	USPAT; EPO; JPO; DERWENT	2002/10/03 10:45
7171	interferometer same detect\$4	USPAT; EPO; JPO; DERWENT	2002/10/03 10:49

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	3	(interferometer same detect\$4) and (US-5771442-\$ or US-6281748-\$ or US-6185259-\$ or US-4381560-\$ or US-4379947-\$ or US-4217467-\$ or US-4206320-\$ or US-3987374-\$ or US-3737776-\$ or US-3406343-\$ or US-3499995-\$ or US-3553367-\$ or US-3366882-\$ or US-3160812-\$ or US-3188573-\$ or US-3260964-\$ or US-3178515-\$ or US-2619547-\$ or US-2582968-\$ or US-2662116-\$ or US-2611826-\$ or US-5748678-\$ or US-4955083-\$ or US-4584540-\$ or US-3958191-\$ or US-5678183-\$).did. or (US-5577087-\$ or US-5602868-\$ or US-6256124-\$ or US-6124960-\$ or US-6134033-\$ or US-6122086-\$ or US-5946119-\$ or US-5880870-\$ or US-5373382-\$ or US-5694094-\$ or US-6259836-\$ or US-6256127-\$ or US-6130767-\$ or US-5910852-\$ or US-5691832-\$ or US-5699179-\$ or US-5473460-\$ or US-5420868-\$ or US-5422772-\$ or US-5291516-\$ or US-5999300-\$ or US-5828478-\$ or US-4912526-\$ or US-4408354-\$ or US-4893353-\$ or US-5428664-\$ or US-6097525-\$).did. or (US-5917628-\$ or US-5339183-\$ or US-5394261-\$ or US-3956626-\$ or US-5249302-\$ or US-5422931-\$ or US-5179360-\$ or US-6192070-\$ or US-5477375-\$ or US-4468766-\$).did.)	USPAT; EPO; JPO; DERWENT	2002/10/03 10:47
	9	interferometer and ((US-5771442-\$ or US-6281748-\$ or US-6185259-\$ or US-4381560-\$ or US-4379947-\$ or US-4217467-\$ or US-4206320-\$ or US-3987374-\$ or US-3737776-\$ or US-3406343-\$ or US-3499995-\$ or US-3553367-\$ or US-3366882-\$ or US-3160812-\$ or US-3188573-\$ or US-3260964-\$ or US-3178515-\$ or US-2619547-\$ or US-2582968-\$ or US-2662116-\$ or US-2611826-\$ or US-5748678-\$ or US-4955083-\$ or US-4584540-\$ or US-3958191-\$ or US-5678183-\$).did. or (US-5577087-\$ or US-5602868-\$ or US-6256124-\$ or US-6124960-\$ or US-6134033-\$ or US-6122086-\$ or US-5946119-\$ or US-5880870-\$ or US-5373382-\$ or US-5694094-\$ or US-6259836-\$ or US-6256127-\$ or US-6130767-\$ or US-5910852-\$ or US-5691832-\$ or US-5699179-\$ or US-5473460-\$ or US-5420868-\$ or US-5422772-\$ or US-5291516-\$ or US-5999300-\$ or US-5828478-\$ or US-4912526-\$ or US-4408354-\$ or US-4893353-\$ or US-5428664-\$ or US-6097525-\$).did. or (US-5917628-\$ or US-5339183-\$ or US-5394261-\$ or US-3956626-\$ or US-5249302-\$ or US-5422931-\$ or US-5179360-\$ or US-6192070-\$ or US-5477375-\$ or US-4468766-\$).did.)	USPAT; EPO; JPO; DERWENT	2002/10/03 10:52
	74084	((intensity or amplitude) with modulat\$4)	USPAT; EPO; JPO; DERWENT	2002/10/03 10:51
	64651	phase with modulat\$4	USPAT; EPO; JPO; DERWENT	2002/10/03 10:52

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-	24823	{{(intensity or amplitude) with modulat\$4}} and {phase with modulat\$4}	USPAT; EPO; JPO; DERWENT	2002/10/03 13:10
-	15160	359/109-195.ccls.	USPAT; EPO; JPO; DERWENT	2002/10/03 10:52
-	1022	{{{(intensity or amplitude) with modulat\$4}} and {phase with modulat\$4}} and 359/109-195.ccls.	USPAT; EPO; JPO; DERWENT	2002/10/03 10:52
-	249	interferometer and {{{{(intensity or amplitude) with modulat\$4}} and {phase with modulat\$4}} and 359/109-195.ccls.}	USPAT; EPO; JPO; DERWENT	2002/10/03 10:59
-	3546	interferometer same receiv\$4	USPAT; EPO; JPO; DERWENT	2002/10/03 12:34
-	317	{interferometer same receiv\$4} same {phase with modulat\$4}	USPAT; EPO; JPO; DERWENT	2002/10/03 11:02
-	48	{{interferometer same receiv\$4} same {phase with modulat\$4}} and 359/109-195.ccls.	USPAT; EPO; JPO; DERWENT	2002/10/03 11:02
-	259	interferometer with demodulat\$4	USPAT; EPO; JPO; DERWENT	2002/10/03 12:36
-	105	interferometer with demodulat\$4 with phase	USPAT; EPO; JPO; DERWENT	2002/10/03 12:43
-	5	{interferometer with demodulat\$4 with phase} and 359/109-195.ccls.	USPAT; EPO; JPO; DERWENT	2002/10/03 12:43
-	19526	{{(intensity or amplitude) with modulat\$4}} same {phase with modulat\$4}	USPAT; EPO; JPO; DERWENT	2002/10/03 13:10
-	771	{{{(intensity or amplitude) with modulat\$4}} same {phase with modulat\$4}} and 359/109-195.ccls.	USPAT; EPO; JPO; DERWENT	2002/10/03 13:10
-	224	{{{(intensity or amplitude) with modulat\$4}} same {phase with modulat\$4}} same {alternate}	USPAT; EPO; JPO; DERWENT	2002/10/03 13:19
-	6	{{{{{(intensity or amplitude) with modulat\$4}} same {phase with modulat\$4}} same {alternate}} and 359/109-195.ccls.	USPAT; EPO; JPO; DERWENT	2002/10/03 13:20
-	1111	{{{(intensity or amplitude) with modulat\$4}} same {phase with modulat\$4}} same {mode}	USPAT; EPO; JPO; DERWENT	2002/10/03 13:20
-	86	{{{{{(intensity or amplitude) with modulat\$4}} same {phase with modulat\$4}} same {mode}} and 359/109-195.ccls.	USPAT; EPO; JPO; DERWENT	2002/10/04 09:14
-	11	("4584720" "5483372" "5504609" "5541755" "5559624" "5594384" "5594577" "5625327" "5726784" "5784184" "5960040").PN.	USPAT	2002/10/03 13:57
-	14	("3986020" "4302835" "4307468" "4369524" "4403139" "4427895" "4504974" "4504976" "4561117" "4567586" "4581730" "4648134" "4704741" "4706300").PN.	USPAT	2002/10/03 15:50
-	2	("5991477").PN.	USPAT; EPO; JPO; DERWENT	2002/10/04 14:15
-	2	("6124960").PN.	USPAT; EPO; JPO; DERWENT	2002/10/04 12:18
-	2	("5577087").PN.	USPAT; EPO; JPO; DERWENT	2002/10/04 13:13
-	2	("4824201").PN.	USPAT; EPO; JPO; DERWENT	2002/10/04 13:14

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-	2	("5,577,087").PN.	USPAT; EPO; JPO; DERWENT	2002/10/04 14:34
-	2	("5319438").PN.	USPAT; EPO; JPO; DERWENT	2002/10/04 15:08
-	2	delayed adj feedback with ("xor" or exclusive adj "or")	USPAT; EPO; JPO; DERWENT	2002/10/04 15:11
-	5	((("5319438") or ("5577087") or ("6122086") or ("4824201") or ("6124960")).PN.	USPAT	2002/10/04 15:12
-	6	((("5319438") or ("5577087") or ("6122086") or ("4824201") or ("6124960") or ("6256124")).PN.	USPAT	2002/10/04 15:15
-	1	("re36430").PN.	USPAT	2002/10/04 15:27
-	758	(359/135-140).CCLS.	USPAT	2002/10/04 15:28
-	68	((359/135-140).CCLS.) and ((amplitude or intensity) with modulatt\$4) and (phase with modulatt\$4)	USPAT; EPO; JPO; DERWENT	2002/10/04 15:30
-	4	4691312.URPN.	USPAT	2002/10/04 15:46
-	2	("6,124,960").PN.	USPAT; EPO; JPO; DERWENT	2003/03/02 09:59
-	10	((("6,124,960") or ("6,122,086") or ("4,824,201") or ("5,577,087") or ("5,319,438")).PN.	USPAT; EPO; JPO; DERWENT	2003/03/02 12:49
-	2	("20020093713").PN.	USPAT; US-PGPUB; EPO; JPO; DERWENT	2003/03/02 12:49
-	2	5,483,370.pn.	USPAT; EPO; JPO; DERWENT	2003/03/03 16:47
-	1003	359/110.ccls.	USPAT; EPO; JPO; DERWENT	2003/03/03 16:47
-	9	359/110.ccls. and ((monitor with power) same tap)	USPAT; EPO; JPO; DERWENT	2003/03/06 10:43
-	2	6215565.pn.	USPAT; EPO; JPO; DERWENT	2003/03/05 16:25

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L Number	Hits	Search Text	DB	Time stamp
-	85	398/185.ccls.	USPAT	2003/08/29 14:41
-	85	398/185.ccls.	USPAT	2003/08/29 14:41
-	0	398/185.ccls. and (phase same (amplitude or intensity))	USPAT	2003/08/29 14:42
-	65	398/185.ccls. and (phase and (amplitude or intensity))	USPAT	2003/08/29 14:44
-	166	398/186,188.ccls.	USPAT	2003/08/29 14:45
-	92	398/186.ccls.	USPAT	2003/08/29 14:45
-	92	398/188.ccls.	USPAT	2003/08/29 14:45
-	18	398/186.ccls. and 398/188.ccls.	USPAT	2003/08/29 14:56
-	45	398/40.ccls.	USPAT	2003/08/29 14:56

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US006665500B2

(12) **United States Patent**
Snawerdt

(10) **Patent No.: US 6,665,500 B2**
(45) **Date of Patent: Dec. 16, 2003**

- (54) **DUAL-MODE FIBER OPTIC TELECOMMUNICATIONS SYSTEM AND METHOD**
- (75) **Inventor:** Peter Snawerdt, Melbourne Beach, FL (US)
- (73) **Assignee:** Oyster Optics, Inc., New York, NY (US)
- (*) **Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 344 days.

(21) **Appl. No.: 09/772,018**

(22) **Filed: Jan. 29, 2001**

(65) **Prior Publication Data**

US 2002/0101640 A1 Aug. 1, 2002

- (51) **Int. Cl.⁷** **H04B 10/04**
- (52) **U.S. Cl.** **398/185; 398/186; 398/188**
- (58) **Field of Search** **559/180, 181, 559/182, 183, 184, 185, 186, 187, 188, 110; 398/185, 186, 188, 202, 203, 204**

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,754,452 A	6/1988	Henry	370/85
4,824,201 A	4/1989	Kazovsky	380/96.16
5,223,967 A	6/1993	Udd	359/119
5,239,306 A	8/1993	Siwiak et al.	340/825.44
5,291,516 A	3/1994	Dixon et al.	375/1
5,319,438 A	6/1994	Kiasaleh	356/345
5,455,698 A	10/1995	Udd	359/119
5,483,370 A	1/1996	Takahashi	359/128
5,543,952 A	8/1996	Yonenaga et al.	359/181
5,577,087 A	11/1996	Furuya	375/377
5,606,446 A	2/1997	Davis et al.	359/173
5,625,479 A	4/1997	Suzuki et al.	359/135
5,726,784 A	3/1998	Alexander et al.	359/125

5,757,912 A	5/1998	Blow	380/21
5,793,512 A	8/1998	Ryu	359/179
5,822,102 A	10/1998	Bodeep et al.	359/167
5,896,211 A	4/1999	Watanabe	359/124
5,920,416 A	7/1999	Beylat et al.	359/181
5,940,452 A	8/1999	Rich	375/347
5,946,119 A	8/1999	Bergano et al.	359/124
5,953,139 A	9/1999	Nemecek et al.	359/124
5,953,421 A	9/1999	Townsend	380/21
RE36,430 E	12/1999	Halbert-Lassalle et al.	370/204
6,072,615 A	6/2000	Mamyshev	359/183
6,097,525 A	8/2000	Ono et al.	359/181
6,122,086 A	9/2000	Djupsjobacka	359/181
6,124,960 A	9/2000	Garthe et al.	359/181
6,215,565 B1 *	4/2001	Davis et al.	359/110
6,243,505 B1	6/2001	Bosso et al.	385/2
6,256,130 B1	7/2001	Bulow	359/173

FOREIGN PATENT DOCUMENTS

EP	0977382	2/2000
JP	06053904	2/1994

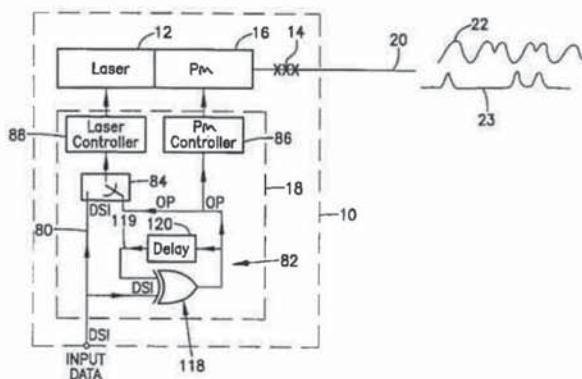
* cited by examiner

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(57) **ABSTRACT**

An optical data transmitter includes at least one light source, a phase modulator for phase modulating light from the light source, and a controller having an input for receiving an electronic data stream, the controller in a first mode controlling the phase modulator so as to create phase-modulated optical signals in the light as a function of the electronic data stream and the controller in a second alternate mode amplitude-modulating the light as a function of the electronic data stream. A dual-mode receiver, an optical data transmission system and a dual-mode optical signal are also disclosed.

19 Claims, 2 Drawing Sheets



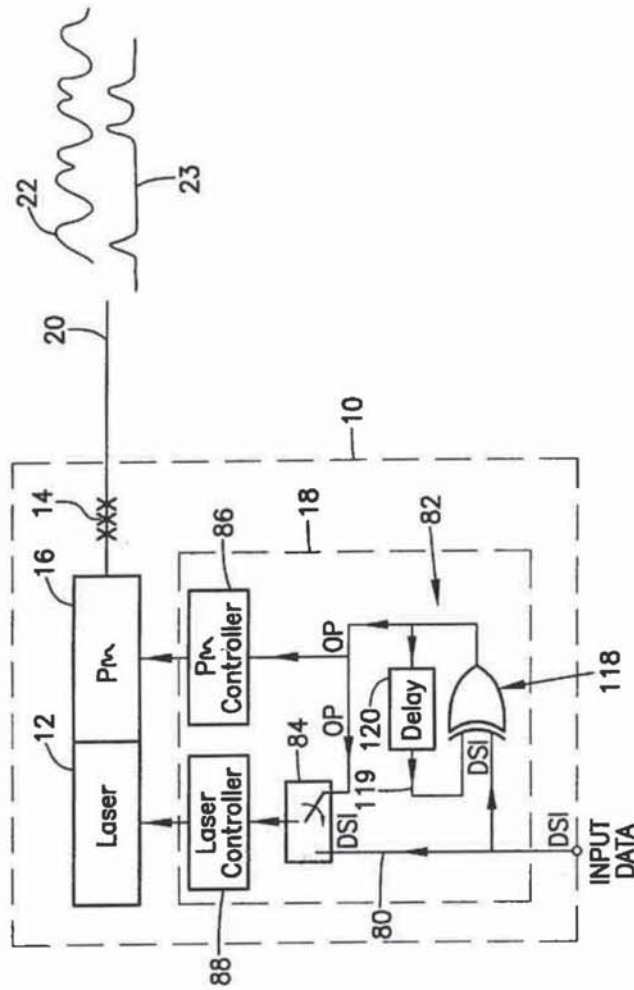


Fig. 1

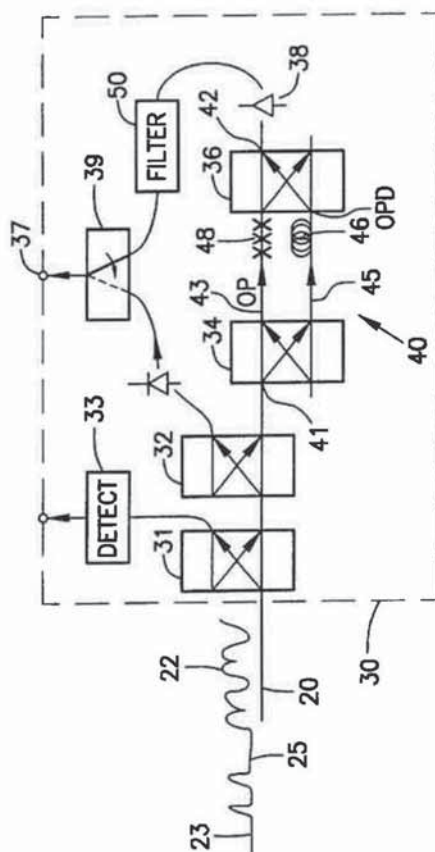


Fig. 2



Fig. 3

1 DUAL-MODE FIBER OPTIC TELECOMMUNICATIONS SYSTEM AND METHOD

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates generally to telecommunications and more particularly to transmitters and receivers for fiber optic networks.

2. Background Information

In current fiber optic networks, an electronic data stream is fed to a laser amplitude modulator. The laser amplitude modulator typically pulses or alters the laser output to create an amplitude-modulated optical signal representative of the electronic data stream. The laser amplitude modulator and laser thus define a transmitter for transmitting the optical signal over an optical fiber, which is then received by a receiver. The receiver for the amplitude-modulated optical signals of the optical data typically includes a photodiode to convert the optical signals back into the electronic data stream.

The reading of the amplitude-modulated optical data signals using a photodiode is straightforward: the optical signals either produce an electric output at the photodiode or they do not. As a result, an output electronic data stream of zeros and ones is generated.

However, optical fiber may be tapped. The optical fibers can be spliced or even merely clamped so as to obtain optical signals from the fiber. It also may be possible to tap fibers without physically touching the optical fiber, for example by reading energy emanating or dissipating along the fiber. Amplitude-modulated optical signals, with their ease of detection from a photodiode, require that only a small amount of energy be tapped and passed through the photodiode in order to be converted into a tapped electronic data stream.

To confront non-secure optical and non-optical data lines, it has been known to use public key/private key encryption so that the data stream being transmitted is encoded in a format that makes it difficult to decode. Encryption however has several drawbacks, including the need for extra processing steps and time. Moreover, public key/private key encrypted data can be cracked, and the devices and algorithms for doing so are constantly improving.

U.S. Pat. No. 5,455,698 purports to disclose a secure fiber optic communications system based on the principles of a Sagnac interferometer. A data transmitter is a phase modulator for modulating counter-propagating light beams sent by a receiver round a loop. The receiver includes a light source, a beamsplitter for splitting light from the light source into counter-propagating light beams and for receiving the phase-modulated light beams, and an output detector. U.S. Pat. No. 5,223,967 describes a similar Sagnac-interferometer-based system operating over a single optical fiber.

The Sagnac-interferometer-based systems described in these patents have the disadvantage that they require the light to travel over a loop, whether back and forth in a single fiber or over a long length looped fiber. As a result, either the link budget for the single fiber must be doubled or else a looped fiber with significant and expensive extra length of at least twice that of a single fiber must be laid between the transmitter and the receiver. Moreover, the receiver contains the light source, as opposed to the current installed base where the transmitter has the light source.

The Sagnac-interferometer-based systems thus are expensive to build and operate, and do not work particularly well with existing systems.

U.S. Pat. No. 6,072,615 purports to describe a method for generating a return-to-zero optical pulses using a phase modulator and optical filter. The RZ-pulse optical signal transmitted over the fiber is easily readable by a detector.

U.S. Pat. No. 5,606,446 purports to describe an optical telecommunications system employing multiple phase-compensated optical signals. Multiple interferometric systems are combined for the purpose of multiplexing various payloads on the same optical transmission path. The patent attempts to describe a method for providing fiber usage diversity using optical coherence length properties and a complex transmit/receive system. Each transmitter has a splitter, a plurality of fibers and a plurality of phase modulators to create the multiplexed signal, which is then demultiplexed at the receiver. This system is complex and expensive.

The phase-modulated based systems described above moreover are not compatible with existing receivers, a major disadvantage.

SUMMARY OF THE PRESENT INVENTION

An object of the present invention is to provide a transmitter for transmitting either phase-modulated or amplitude-modulated optical signals. An alternate or additional object of the present invention is to provide a receiver for receiving either phase-modulated or amplitude-modulated optical signals.

The present invention provides a transmitter having at least one light source, a phase modulator for phase modulating light from the light source, and a controller having an input for receiving an electronic data stream, the controller in a first mode controlling the phase modulator so as to create phase-modulated optical signals in the light as a function of the electronic data stream and the controller in a second alternate mode amplitude-modulating the light as a function of the electronic data stream.

The present invention thus permits a phase-modulated transmission mode or an amplitude-modulated transmission mode, or both a phase and amplitude modulated transmission mode, which can permit the transmitter to work with different types of receivers. An optical fiber typically connects the transmitter of the present invention to the receiver.

The controller in the first mode preferably phase-modulates the light as a function of an output of a delayed-feedback exclusive-or gate having the electronic data stream as an input. The first mode is thus a highly secure data transmission mode, as described in co-owned and co-pending U.S. patent application Ser. No. 09/765,153, entitled "Secure Fiber Optics Telecommunications System and Method" and filed on Jan. 17, 2001, the entire disclosure of which is hereby incorporated by reference herein.

In the second mode, the light may be amplitude modulated either by altering the energy provided to the light source or by altering the light emitted by the light source. The light source preferably is a laser, for example a semiconductor laser operating at a 1550 nm, or other, wavelength.

In the second mode, the light may be amplitude modulated either in direct relation to an input data stream (known as the direct second or amplitude-modulated mode), or as a function of an output of a delayed-feedback exclusive-or gate having the electronic data stream as an input (known as

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the delayed second or amplitude-modulated mode). In the delayed second mode, the optical signal may or may not also be phase modulated. In the direct second mode, the amplitude-modulated optical signals sent by the transmitter can be read common receivers, or by the receiver of the present invention. In the delayed second mode, the amplitude-modulated optical signals can be read by the receiver of the present invention as well as by the receiver of incorporated-by-reference U.S. patent application Ser. No. 09/765,153, entitled "Secure Fiber Optics Telecommunications System and Method" and filed on Jan. 17, 2001.

The controller preferably has two circuits, a first circuit for controlling the phase modulation and a second circuit controlling the amplitude modulation. Preferably, a switch, which may be composed of hardware or software, is provided to activate the first mode, the delayed second mode, or the direct second mode. An operator may set the switch of a first transmitter to the first mode, the delayed second mode, or the direct second mode, so that the transmitter generally always operates in that mode.

Alternately, the switch can be controlled by bit data in a packet of a packet-based data input stream. The bit data may be set for example to zero or one or two or three, so that the data contained in the packet is sent either via the first mode or via the direct second mode or the delayed second mode with no phase modulation or the delayed second mode with phase modulation as a function of the bit data. The transmitter thus produces an alternating amplitude-modulated and phase-modulated data stream, which can be read by a receiver of the present invention. The packets preferably contain data regarding the transmission mode for the next packet so as to permit the receiver to have time to switch between alternate receive modes.

Both the operator-set and packet-switched systems have the advantage that telecommunications providers can provide customers differentiated services, for example a secure mode and a non-secure mode, although the bit-based method provides carriers more options for devising service levels.

The at least one light source may include two lasers, a first laser for the amplitude-modulated signals, and a second laser for the phase-modulated signals. A coupler couples the light from the two lasers together. Preferably, however, a single laser directly next to the phase-modulator is provided. This prevents delay between the laser and the phase-modulator when modes are switched.

The present invention also provides a receiver for receiving optical signals, the optical signals including both phase-modulated optical signals and direct amplitude-modulated optical signals. The receiver includes an interferometer for reading the phase-modulated signals and a detector to read the direct amplitude-modulated optical signals.

The receiver also may read delayed amplitude-modulated optical signals through the interferometer.

Preferably, an energy level detector is also provided at the receiver for measuring light energy in a fiber.

Preferably, the second light path has a delay with respect to the first light path, the delay being matched to a delay at the transmitter during the phase-modulated transmission mode and the delayed second amplitude-modulated mode.

The receiver can read a mixed optical signal of both phase-modulated and direct and delayed amplitude-modulated signals, with the direct amplitude-modulated signals being read off the third path.

The receiver can be set by an operator to receive in one of the three modes, or can be switched to the various receive

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modes by a bit set in a packet. For example, the current packet being received sets the receiver to the proper receive mode for the next packet.

The present invention also provides a dual-mode optical transmission system comprising a transmitter for transmitting amplitude-modulated signals in a first mode and phase-modulated signals in a second mode, an optical fiber connected to the transmitter, and a receiver having an interferometer being connected to the optical fiber. The first and second mode signals can be read by the receiver, and can be switched based on either an operator input or packet-based data.

The present invention also provides a method for transmitting optical data in two modes comprising the steps of:

phase modulating light from at least one light source during a first transmission mode so as to transmit phase-modulated optical data; and

amplitude modulating light from the at least one light source during a second alternate transmission mode so as to transmit amplitude-modulated optical data.

Preferably, the at least one light source is a single laser.

The amplitude modulating step may include amplitude modulating the light as a direct function of an input electronic data stream, or as a function of an output of a delayed-feedback exclusive-or gate.

The method may further include switching between the phase modulating and the amplitude modulating steps as a function of a packet bit set.

Also provided by the present invention is an optical signal comprising amplitude-modulated signals representative of an input data stream during a first time period and phase-modulated signals representative of the input data stream during a second time period subsequent or prior to the first time period.

It should be understood however that, while phase-modulated signals are preferred in the secure transmission mode, under certain circumstances a mixture of phase and amplitude modulation could be possible. For example, amplitude modulated signals not related to the input optical data stream could be transmitted during the secure phase-modulation mode without necessarily affecting security.

BRIEF DESCRIPTION OF THE DRAWINGS

Two preferred embodiments of the present invention are described below by reference to the following drawings, in which:

FIG. 1 shows a preferred embodiment of a transmitter of the present invention;

FIG. 2 shows a preferred embodiment of a receiver of the present invention; and

FIG. 3 shows details a packet for possible use with the transmitter of the present invention

DETAILED DESCRIPTION

FIG. 1 shows a preferred embodiment of a dual-mode transmitter 10 according to the present invention for transmitting signals to an optical fiber 20. Transmitter 10 includes a single laser 12, for example a semiconductor laser emitting a narrow band of light at approximately 1550 nm, or at other wavelengths. Light emitted from laser 12 passes through a phase modulator 16, for example a Mach-Zender phase modulator, directly next to or part of the same package as laser 12. The light may be depolarized by a depolarizer 14. An electronic controller 18, for example a PLC, controls phase modulator 16 and the amplitude of the light output of laser 12, for example through pulsing the laser.

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Controller 18 directs the input data DSI to a direct amplitude modulation circuit 80 and to a circuit 82 having a delayed-feedback exclusive-or gate 118. Input data DSI forms one input of exclusive-or gate 118. The other input of the delayed-feedback exclusive-or gate 118 is a feedback loop 119, which feeds back the output of exclusive-or gate 118, and has an electronic delay circuit 120, which causes a delay, for example, a certain number of bits later. Delayed-feedback exclusive-or gate 118 outputs the output electronic data stream OP. The data OP exiting circuit 82 is directed both to a switch 84 and a phase modulator controller 86. Direct circuit 80 also supplies an input with data DSI to switch 84.

The output of switch 84 is directed to an amplitude controller 88 for laser 12, which during an amplitude modulation mode is modulated according to the output from switch 84. Amplitude controller 88, during an amplitude-modulation mode, thus amplitude modulates the laser 12 so that an amplitude-modulated signal 23, representative of either the data DSI or OP, passes to fiber 20.

During an amplitude modulation mode, phase modulator controller 86 either does not phase modulate the light, or phase modulates based upon the output of the delayed feedback exclusive-or circuit 82.

When switch 84 receives data from circuit 82, the laser amplitude is a function of the output OP of the delayed-feedback exclusive-or gate 118. The transmitter 10 thus transmits in a delayed-feedback exclusive-or amplitude-modulated mode, defined herein as the delayed amplitude-modulated mode. When switch 84 receives data DSI from direct circuit 80, the laser amplitude is a direct function of the input electronic data DSI. The transmitter 10 thus transmits in the direct amplitude-modulated mode.

During the alternate phase-modulation mode, the amplitude controller 88 directs the laser to emit constant wavelength, non-pulsed light. Depending on the output OP of circuit 82, phase modulator 16 then either imparts a known initial phase shift to the light which could be 0 degrees or else imparts another known offset phase shift preferably equal to the known initial phase shift+180 degrees on the light passing through phase modulator 16. An optical signal 22, which represents a stream of binary bits, is thus created. Optical signal 22 is transmitted over fiber 20. This signal provides a secure data transmission mode. The phase-modulated signal must be read with an interferometer having a proper delay path, and any tap to obtain enough light to read the phase-modulated signal is easily detectable.

In the direct amplitude modulated mode, a standard receiver can read the signals 23.

In the delayed amplitude modulated mode, signals OP are sent in a pulsed fashion. These signals can be read by the receiver disclosed in incorporated-by-reference U.S. patent application Ser. No. 09/765,153, entitled "Secure Fiber Optics Telecommunications System and Method" and filed on Jan. 17, 2001. A standard receiver with a photodiode also could read the delayed amplitude modulated signals. The photodiode output could then be split into two legs, with one leg having a delay, which must be similar to the delay 120 in the delayed-feedback exclusive-or gate 118. The two legs are then passed through an exclusive-or gate to obtain the proper signal DSI.

In the phase-modulated mode, the phase-modulated signals 22 can be read by the receiver disclosed in incorporated-by-reference U.S. patent application Ser. No. 09/765,153, entitled "Secure Fiber Optics Telecommunications System and Method" and filed on Jan. 17, 2001. The signals 22 pass

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through a splitter, with one path having an optical delay similar to the delay 120. The light recombines in a coupler so that input stream DSI can be reconstituted.

Receiver 10 shown in FIG. 2 is a preferred embodiment permitting three modes. However, the present invention also encompasses a transmitter with the phase-modulated mode and only one of the direct and delayed amplitude-modulated modes. A transmitter with the phase-modulated mode and the direct amplitude-modulated mode only, for example, is backwards-compatible with existing receivers in the amplitude-modulated mode and yet can provide a secure and non-secure mode with receivers having an interferometer as disclosed herein. A transmitter with the phase-modulated mode and the delayed amplitude-modulated mode only provides secure and non-secure modes and is compatible for both modes with the receiver disclosed in U.S. patent application Ser. No. 09/765,153, entitled "Secure Fiber Optics Telecommunications System and Method" and filed on Jan. 17, 2001.

The present invention also provides a receiver compatible with existing transmitters, with the transmitter disclosed in U.S. patent application Ser. No. 09/765,153, entitled "Secure Fiber Optics Telecommunications System and Method" and filed on Jan. 17, 2001, and with the transmitter of the present invention.

As shown in FIG. 2, receiver 30 can receive either direct or delayed amplitude-modulated signals as well as phase-modulated signals. Receiver 30 includes a coupler/splitter 31, functioning as a splitter. Splitter 31 splits off a portion of the light, directing part of the optical energy to an energy level or tap detector 33 and passes the remaining light to a second coupler/splitter 32.

Splitter 32 splits light to a photodiode 35 for converting amplitude-modulated optical signals into electrical signals. The receiver also has an interferometer 40 receiving the rest of the light from splitter 32. The interferometer 40 has a coupler/splitter 34, functioning as a splitter, and a coupler/splitter 36, functioning as a coupler.

Detector 33 monitors, during the phase-modulation transmission mode, the light energy in the fiber 20 via the light energy coupled to the detector by splitter 31. If the amplitude drops during this mode, most likely from a tap, the detector alerts the receiver and can, for example, sound an alarm or alert network maintenance personnel. Additionally, since the receiver is generally part of a component box, which also includes a transmitter, the component box transmitter can send a signal back to the component box containing transmitter 10 so as to instruct transmitter 10 to stop sending data, or to send data over a standby fiber. During an amplitude-modulation transmission mode, the detector 33 can be set to a different trip level.

Optical signals 22, 23 in fiber 20, after passing splitter 31 and splitter 32, enter interferometer 40 at an input 41 of splitter 34. Splitter 34 splits the light entering input 41, so that the signals 22, 23 travel over both a first fiber 43 and a second fiber 45. A depolarizer 48 may depolarize light passing through fiber 43, preferably, or fiber 45 as an alternative. Second fiber 45 includes a delay fiber 46 which may include a fiber loop of a desired length. Delay fiber 46 then provides an input to coupler 36 which recombines the delayed signal with the non-delayed signal propagating through fiber 43 and depolarizer 48 at output 42. The physical delay imposed by the interferometer 40 in the second light path through fiber 45, with its delay loop 46, with respect to light passing through the first light path through fiber 43 and depolarizer 48 is selected to match as

closely as possible an electronic delay time imposed by electronic delay circuit 120 of the controller 18. If the first path in the interferometer 40 has a length L1 and the second path a length L2, the length L2 is selected, preferably by sizing loop 46, as a function of L1, the speed of light v in fibers 43 and 45, the light propagation delay through the depolarizer 48, DPD, and the electronic delay time ED. The speed of light in the fibers may be estimated as a function of the wavelength and the type of fiber used. The length L1 is known. When depolarizer 48 is in path 43, L2 is then chosen to approximate, and preferably equal, the amount $(ED + DPD) \cdot v + L1$.

The phase-modulated signals 22 recombining at output 42 thus recombine the signal OP with a delayed signal OPD, delayed by an amount of time equivalent to the electronic delay time ED. If the data in the OP and OPD signals each represents a zero, or each represents a one, at the inputs 44 and 47 to coupler 36, the signals 22 will destructively interfere when recombined at output 42 of coupler 36. Output detector 38 then detects no light and produces a zero signal. If one of the data bits in the OP and OPD signals represents a zero and the other one represents a one, at the inputs 44 and 47 to coupler 36, the signals will constructively interfere when recombined at coupler output 42. This is true for both phase-modulated and amplitude-modulated signals. Output detector 38 then detects light and produces an electronic signal representative of a one. When receiving phase-modulated signals or the delayed amplitude-modulated signals, detector 38 thus outputs the input data stream DSI. A filter 50 can be provided to filter out noise or other minor inaccuracies in the recombination of the signals. This stream is transmitted via a switch 39 to output 37.

The interferometer 40 comprising coupler/splitter 34 and 36, fibers 43 and 45, delay fiber 46, and depolarizer 48 functions as an optical exclusive-or gate with one input leg delayed for signals arriving at input 41 of coupler 34. Interferometer 40 as a whole thus optically and physically "decodes" the signal OP produced by the delayed-feedback exclusive-or gate 118.

When receiving direct amplitude modulated signals, the detector outputs a signal that is meaningless. Switch 39 is thus set to receive an input from photodiode 35, which is representative of stream DSI, and thus stream DSI is sent to output 37.

The receiver of the present invention thus can receive both direct amplitude-modulated signals and phase-modulated signals. The receiver 30 also could include a circuit after photodiode 35 so as to convert the delayed amplitude-modulated signals to the stream DSI. In this case, the output detector 38 would only be used to read the phase-modulated signals.

Controlling of the change between secure mode and the amplitude-modulated modes can function in a variety of ways, depending on the overall system configuration. With the transmitter 10 and the receiver 30, an operator can configure the transmitter 10 and receiver 30 so that the system functions in any of the three modes.

If the system includes a dual-mode transmitter (defined herein as a transmitter with a phase-modulation mode and one or more amplitude-modulation modes), an input packet data bit also could be used to set the mode.

Signal 25 in FIG. 2 is shown as a combination of amplitude-modulated signals 23 and phase-modulated signals 22, which occurs for example when packets with different modes are sent one after another.

FIG. 3 shows an example of such a packet 200 having a data payload 201, and address 202, and mode data 203.

Depending on the mode data, the transmitter transmits in a phase-modulated or amplitude-modulated mode. If the transmitter is similar to transmitter 30, the mode data further includes whether to amplitude-modulate in direct or delayed mode. Preferably, the mode data 203 is set not for its own packet N, but for the following packet N+1, thus providing a buffer time for the receiver to change modes. Thus, when packet N+1 is received, the receiver is set to the proper receive mode. The mode data could also be set more than one packet ahead, for example N+2.

If both a dual mode transmitter and a dual mode receiver are used in a system, a telecommunications service provider thus could charge certain customers for an enhanced secure mode service for their packet-based data, while permitting other customers to send data in a non-secure mode in their packets.

An alternate embodiment of the transmitter of the present invention can include two lasers, with the first laser being controlled during the amplitude modulation modes. The second laser is a continuous wave laser modulated by a phase modulator in the alternate secure mode. A coupler couples the light from the first laser and second lasers together, so that the optical signal for either mode travels over a single fiber.

What is claimed is:

1. An optical data transmitter comprising:

- a laser;
- a phase modulator for phase modulating light from the light source; and
- a controller having an input for receiving an electronic data stream, the controller in a first mode controlling the phase modulator so as to create phase-modulated optical signals in the light from the laser as a function of the electronic data stream and the controller in a second alternate mode amplitude-modulating the light from the laser as a function of the electronic data stream, the first mode and the second mode occurring at different times.
2. The transmitter as recited in claim 1 wherein the controller in the second mode amplitude modulates the light in direct relation to the input data stream.
3. The transmitter as recited in claim 1 wherein the controller in the second mode amplitude modulates the light as a function of an output of a delayed-feedback exclusive-or gate having the electronic data stream as an input.
4. The transmitter as recited in claim 1 wherein the controller has a switch for switching between the first and second modes.
5. The transmitter as recited in claim 4 wherein the switch is operator-activated.
6. The transmitter as recited in claim 1 wherein the switch is bit-data activated.
7. The transmitter as recited in claim 6 wherein bit data contained in a packet activates the switch.
8. The transmitter as recited in claim 1 wherein the laser is directly adjacent the phase-modulator.
9. The transmitter as recited in claim 1 wherein during the second mode the phase-modulator provides a constant or no phase-modulation change.
10. An optical data transmitter comprising:
 - a light source;
 - a phase modulator for phase modulating light from the light source; and a controller having an input for receiving an electronic data stream, the controller in a

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first mode controlling the phase modulator so as to create phase-modulated optical signals in the light from the light source as a function of the electronic data stream and the controller in a second alternate mode amplitude-modulating the light from the light source as a function of the electronic data stream; wherein the controller in the first mode preferably phase-modulates the light as a function of an output of a delayed-feedback exclusive-or gate having the electronic data stream as an input.

11. A receiver for receiving optical signals, the optical signals including both phase-modulated optical signals and direct amplitude-modulated optical signals, the receiver comprising:

an interferometer for reading the phase-modulated signals; and

a detector to read the direct amplitude-modulated optical signals;

wherein the interferometer receives delayed amplitude-modulated optical signals.

12. The receiver as recited in claim 11 further comprising a switch for switching between an output of the interferometer and another output of the detector.

13. The receiver as recited in claim 12 wherein the switch is operator-controlled.

14. The receiver as recited in claim 12 wherein the switch is bit-data controlled.

15. The receiver as recited in claim 11 further comprising an energy level detector for measuring light energy in a fiber.

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16. A dual-mode optical transmission system comprising: a transmitter having a laser for transmitting amplitude-modulated signals in a first mode and phase-modulated signals in a second mode and a controller for switching an output of the laser between the first mode and the second mode, the second mode occurring at a different time than the first mode;

an optical fiber connected to the transmitter; and

a receiver having an interferometer being connected to the optical fiber.

17. A method for transmitting optical data in two modes comprising the steps of:

phase modulating light from a laser during a first transmission mode so as to transmit phase-modulated optical data; and

amplitude modulating light from the laser during a second alternate transmission mode so as to transmit amplitude-modulated optical data, the second alternate transmission mode occurring at a time separate from the first transmission mode.

18. The method as recited in claim 17 wherein during the first transmission mode the light is not amplitude-modulated.

19. The method as recited in claim 17 wherein during the second alternate transmission mode the light is both amplitude-modulated and phase-modulated.

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12345678910111213141516171819202122232425262728293031323334353637383940414243444546474849505152535455565758596061626364656667686970717273747576777879808182838485868788899091929394959697989910010110210310410510610710810911011111211311411511611711811912012112212312412512612712812913013113213313413513613713813914014114214314414514614714814915015115215315415515615715815916016116216316416516616716816917017117217317417517617717817918018118218318418518618718818919019119219319419519619719819920020120220320420520620720820921021121221321421521621721821922022122222322422522622722822923023123223323423523623723823924024124224324424524624724824925025125225325425525625725825926026126226326426526626726826927027127227327427527627727827928028128228328428528628728828929029129229329429529629729829930030130230330430530630730830931031131231331431531631731831932032132232332432532632732832933033133233333433533633733833934034134234334434534634734834935035135235335435535635735835936036136236336436536636736836937037137237337437537637737837938038138238338438538638738838939039139239339439539639739839940040140240340440540640740840941041141241341441541641741841942042142242342442542642742842943043143243343443543643743843944044144244344444544644744844945045145245345445545645745845946046146246346446546646746846947047147247347447547647747847948048148248348448548648748848949049149249349449549649749849950050150250350450550650750850951051151251351451551651751851952052152252352452552652752852953053153253353453553653753853954054154254354454554654754854955055155255355455555655755855956056156256356456556656756856957057157257357457557657757857958058158258358458558658758858959059159259359459559659759859960060160260360460560660760860961061161261361461561661761861962062162262362462562662762862963063163263363463563663763863964064164264364464564664764864965065165265365465565665765865966066166266366466566666766866967067167267367467567667767867968068168268368468568668768868969069169269369469569669769869970070170270370470570670770870971071171271371471571671771871972072172272372472572672772872973073173273373473573673773873974074174274374474574674774874975075175275375475575675775875976076176276376476576676776876977077177277377477577677777877978078178278378478578678778878979079179279379479579679779879980080180280380480580680780880981081181281381481581681781881982082182282382482582682782882983083183283383483583683783883984084184284384484584684784884985085185285385485585685785885986086186286386486586686786886987087187287387487587687787887988088188288388488588688788888989089189289389489589689789889990090190290390490590690790890991091191291391491591691791891992092192292392492592692792892993093193293393493593693793893994094194294394494594694794894995095195295395495595695795895996096196296396496596696796896997097197297397497597697797897998098198298398498598698798898999099199299399499599699799899910001001100210031004100510061007100810091010101110121013101410151016101710181019102010211022102310241025102610271028102910301031103210331034103510361037103810391040104110421043104410451046104710481049105010511052105310541055105610571058105910601061106210631064106510661067106810691070107110721073107410751076107710781079108010811082108310841085108610871088108910901091109210931094109510961097109810991100110111021103110411051106110711081109111011111112111311141115111611171118111911201121112211231124112511261127112811291130113111321133113411351136113711381139114011411142114311441145114611471148114911501151115211531154115511561157115811591160116111621163116411651166116711681169117011711172117311741175117611771178117911801181118211831184118511861187118811891190119111921193119411951196119711981199120012011202120312041205120612071208120912101211121212131214121512161217121812191220122112221223122412251226122712281229123012311232123312341235123612371238123912401241124212431244124512461247124812491250125112521253125412551256125712581259126012611262126312641265126612671268126912701271127212731274127512761277127812791280128112821283128412851286128712881289129012911292129312941295129612971298129913001

CONFIRMATION NO. 9221

SERIAL NUMBER 09/772,018	FILING DATE 01/29/2001 RULE	CLASS 359	GROUP ART UNIT 2633	ATTORNEY DOCKET NO. 514.1002	
APPLICANTS Peter Snawerdt, Melbourne, FL; ** CONTINUING DATA ***** none cl ** FOREIGN APPLICATIONS ***** none cl ** SMALL ENTITY **					
Foreign Priority claimed <input type="checkbox"/> yes <input checked="" type="checkbox"/> no 35 USC 119 (a-d) conditions met <input type="checkbox"/> yes <input checked="" type="checkbox"/> no <input type="checkbox"/> Met after Allowance Verified and Acknowledged Examiner's Signature: <i>[Signature]</i> Initials: <i>[Initials]</i>		STATE OR COUNTRY FL	SHEETS DRAWING 3	TOTAL CLAIMS 22	INDEPENDENT CLAIMS 5
ADDRESS DAVIDSON, DAVIDSON & KAPPEL, LLC 485 Seventh Avenue, 14 th Floor 440 Avenue of the Americas, 15th Floor New York, NY 10035-10018					
TITLE Dual-mode fiber optic telecommunications system and method					
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UTILITY PATENT APPLICATION TRANSMITTAL
(Small Entity)
(Only for new nonprovisional applications under 37 CFR 1.53(b))

TO THE ASSISTANT COMMISSIONER FOR PATENTS
Box Patent Application
Washington, D.C. 20231

Docket No.
514.1002

Total Pages in this Submission
127

Transmitted herewith for filing under 35 U.S.C. 111(a) and 37 C.F.R. 1.53(b) is a new utility patent application for an invention entitled:
DUAL-MODE FIBER OPTIC TELECOMMUNICATIONS SYSTEM AND METHOD

and invented by:
Peder SNAWERDT

If a **CONTINUATION APPLICATION**, check appropriate box and supply the requisite information:
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Enclosed are:
Application Elements

- ☒ Filing fee as calculated and transmitted as described below
- ☒ Specification having 16 pages and including the following:
 - ☒ Descriptive Title of the Invention
 - ☐ Cross References to Related Applications (if applicable)
 - ☐ Statement Regarding Federally-sponsored Research/Development (if applicable)
 - ☐ Reference to Microfiche Appendix (if applicable)
 - ☒ Background of the Invention
 - ☒ Brief Summary of the Invention
 - ☒ Brief Description of the Drawings (if drawings filed)
 - ☒ Detailed Description
 - ☒ Claim(s) as Classified Below
 - ☒ Abstract of the Disclosure

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Application Elements (Continued)

3. ☒ Drawing(s) *(when necessary as prescribed by 35 USC 113)*
a. ☐ Formal b. ☒ Informal Number of Sheets 3
4. ☒ Oath or Declaration
a. ☒ Newly executed *(original or copy)* ☐ Unexecuted
b. ☐ Copy from a prior application (37 CFR 1.63(d)) *(for continuation/divisional application only)*
c. ☒ With Power of Attorney ☐ Without Power of Attorney
d. ☐ DELETION OF INVENTOR(S)
Signed statement attached deleting inventor(s) named in the prior application,
see 37 C.F.R. 1.63(d)(2) and 1.33(b).
5. ☐ Incorporation By Reference *(usable if Box 4b is checked)*
The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied under
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incorporated by reference therein.
6. ☐ Computer Program in Microfiche
7. ☐ Genetic Sequence Submission *(if applicable, all must be included)*
a. ☐ Paper Copy
b. ☐ Computer Readable Copy
c. ☐ Statement Verifying Identical Paper and Computer Readable Copy

Accompanying Application Parts

8. ☒ Assignment Papers *(cover sheet & documents)*
9. ☐ 37 CFR 3.73(b) Statement *(when there is an assignee)*
10. ☐ English Translation Document *(if applicable)*
11. ☒ Information Disclosure Statement/PTO-1449 ☒ Copies of IDS Citations
12. ☐ Preliminary Amendment
13. ☒ Acknowledgment postcard
14. ☒ Certificate of Mailing
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Accompanying Application Parts (Continued)

15. ☐ Certified Copy of Priority Document(s) (if foreign priority is claimed)

16. ☐ Small Entity Statement(s) - Specify Number of Statements Submitted: _____

17. ☐ Additional Enclosures (please identify below):

Request That Application Not Be Published Pursuant To 35 U.S.C. 122(b)(2)

18. ☐ Pursuant to 35 U.S.C. 122(b)(2), Applicant hereby requests that this patent application not be published pursuant to 35 U.S.C. 122(b)(1). Applicant hereby certifies that the invention disclosed in this application has not and will not be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication of applications 18 months after filing of the application.

Warning

An applicant who makes a request not to publish, but who subsequently files in a foreign country or under a multilateral international agreement specified in 35 U.S.C. 122(b)(2)(B)(i), must notify the Director of such filing not later than 45 days after the date of the filing of such foreign or international application. A failure of the applicant to provide such notice within the prescribed period shall result in the application being regarded as abandoned, unless it is shown to the satisfaction of the Director that the delay in submitting the notice was unintentional.

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Docket No.
514.1002

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Fee Calculation and Transmittal

CLAIMS AS FILED

For	#Filed	#Allowed	#Extra	Rate	Fee
Total Claims	22	- 20 =	2	x \$9.00	\$18.00
Indep. Claims	4	- 3 =	1	x \$40.00	\$40.00
Multiple Dependent Claims (check if applicable) <input type="checkbox"/>					\$0.00
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OTHER FEE (specify purpose) <u>Recordation of Executed Assignment</u>					\$40.00
TOTAL FILING FEE					\$453.00

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Dated: January 29, 2001


Signature
William C. Gehris, Reg. No. 38,156



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5 DUAL-MODE FIBER OPTIC TELECOMMUNICATIONS SYSTEM AND
METHOD

BACKGROUND OF THE INVENTION

1. Field of the Invention

10 The present invention relates generally to telecommunications and more particularly to transmitters and receivers for fiber optic networks.

2. Background Information

15 In current fiber optic networks, an electronic data stream is fed to a laser amplitude modulator. The laser amplitude modulator typically pulses or alters the laser output to create an amplitude-modulated optical signal representative of the electronic data stream. The laser amplitude modulator and laser thus define a transmitter for transmitting the optical signal over an optical fiber, which is then received by a receiver. The receiver for the amplitude-modulated optical signals of the optical data typically includes a photodiode to convert the optical signals back into the electronic data stream.

20 The reading of the amplitude-modulated optical data signals using a photodiode is straightforward: the optical signals either produce an electric output at the photodiode or they do not. As a result, an output electronic data stream of zeros and ones is generated.

25 However, optical fiber may be tapped. The optical fibers can be spliced or even merely clamped so as to obtain optical signals from the fiber. It also may be possible to tap fibers without physically touching the optical fiber, for example by reading energy emanating or dissipating along the fiber. Amplitude-modulated optical signals, with their ease of detection from a photodiode, require that only a small amount of energy be tapped and passed through the photodiode in order to be converted into a tapped electronic data stream.

To confront non-secure optical and non-optical data lines, it has been known to use public key/private key encryption so that the data stream being transmitted is encoded in a format that makes it difficult to decode. Encryption however has several drawbacks, including the need for extra processing steps and time. Moreover, public key/private key encrypted data can be cracked, and the devices and algorithms for doing so are constantly improving.

U.S. Patent No. 5,455,698 purports to disclose a secure fiber optic communications system based on the principles of a Sagnac interferometer. A data transmitter is a phase modulator for modulating counter-propagating light beams sent by a receiver round a loop. The receiver includes a light source, a beamsplitter for splitting light from the light source into counter-propagating light beams and for receiving the phase-modulated light beams, and an output detector. U.S. Patent No. 5,223,967 describes a similar Sagnac-interferometer-based system operating over a single optical fiber.

The Sagnac-interferometer-based systems described in these patents have the disadvantage that they require the light to travel over a loop, whether back and forth in a single fiber or over a long length looped fiber. As a result, either the link budget for the single fiber must be doubled or else a looped fiber with significant and expensive extra length of at least twice that of a single fiber must be laid between the transmitter and the receiver. Moreover, the receiver contains the light source, as opposed to the current installed base where the transmitter has the light source.

The Sagnac-interferometer-based systems thus are expensive to build and operate, and do not work particularly well with existing systems.

U.S. Patent No. 6,072,615 purports to describe a method for generating a return-to-zero optical pulses using a phase modulator and optical filter. The RZ-pulse optical signal transmitted over the fiber is easily readable by a detector.

U.S. Patent No. 5,606,446 purports to describe an optical telecommunications system employing multiple phase-compensated optical signals. Multiple interferometric systems are combined for the purpose of multiplexing various payloads on the same optical transmission path. The patent attempts to describe a method for providing fiber usage diversity using optical coherence length properties and a complex transmit/receive system. Each transmitter has a splitter, a plurality of

fibers and a plurality of phase modulators to create the multiplexed signal, which is then demultiplexed at the receiver. This system is complex and expensive.

The phase-modulated based systems described above moreover are not compatible with existing receivers, a major disadvantage.

SUMMARY OF THE PRESENT INVENTION

An object of the present invention is to provide a transmitter for transmitting either phase-modulated or amplitude-modulated optical signals. An alternate or additional object of the present invention is to provide a receiver for receiving either phase-modulated or amplitude-modulated optical signals.

The present invention provides a transmitter having at least one light source, a phase modulator for phase modulating light from the light source, and a controller having an input for receiving an electronic data stream, the controller in a first mode controlling the phase modulator so as to create phase-modulated optical signals in the light as a function of the electronic data stream and the controller in a second alternate mode amplitude-modulating the light as a function of the electronic data stream.

The present invention thus permits a phase-modulated transmission mode or an amplitude-modulated transmission mode, or both a phase and amplitude modulated transmission mode, which can permit the transmitter to work with different types of receivers. An optical fiber typically connects the transmitter of the present invention to the receiver.

The controller in the first mode preferably phase-modulates the light as a function of an output of a delayed-feedback exclusive-or gate having the electronic data stream as an input. The first mode is thus a highly secure data transmission mode, as described in co-owned and co-pending U.S. Patent Application No. 09/765153, entitled "Secure Fiber Optics Telecommunications System and Method" and filed on January 17, 2001, the entire disclosure of which is hereby incorporated by reference herein.

In the second mode, the light may be amplitude modulated either by altering the energy provided to the light source or by altering the light emitted by the light source. The light source preferably is a laser, for example a semiconductor laser operating at a 1550 nm, or other, wavelength.

In the second mode, the light may be amplitude modulated either in direct relation to an input data stream (known as the direct second or amplitude-modulated mode), or as a function of an output of a delayed-feedback exclusive-or gate having the electronic data stream as an input (known as the delayed second or amplitude-modulated mode). In the delayed second mode, the optical signal may or may not also be phase modulated. In the direct second mode, the amplitude-modulated optical signals sent by the transmitter can be read common receivers, or by the receiver of the present invention. In the delayed second mode, the amplitude-modulated optical signals can be read by the receiver of the present invention as well as by the receiver of incorporated-by-reference U.S. Patent Application No. 09/765153, entitled "Secure Fiber Optics Telecommunications System and Method" and filed on January 17, 2001.

The controller preferably has two circuits, a first circuit for controlling the phase modulation and a second circuit controlling the amplitude modulation. Preferably, a switch, which may be composed of hardware or software, is provided to activate the first mode, the delayed second mode, or the direct second mode. An operator may set the switch of a first transmitter to the first mode, the delayed second mode, or the direct second mode, so that the transmitter generally always operates in that mode.

Alternately, the switch can be controlled by bit data in a packet of a packet-based data input stream. The bit data may be set for example to zero or one or two or three, so that the data contained in the packet is sent either via the first mode or via the direct second mode or the delayed second mode with no phase modulation or the delayed second mode with phase modulation as a function of the bit data. The transmitter thus produces an alternating amplitude-modulated and phase-modulated data stream, which can be read by a receiver of the present invention. The packets preferably contain data regarding the transmission mode for the next packet so as to permit the receiver to have time to switch between alternate receive modes.

Both the operator-set and packet-switched systems have the advantage that telecommunications providers can provide customers differentiated services, for example a secure mode and a non-secure mode, although the bit-based method provides carriers more options for devising service levels.

The at least one light source may include two lasers, a first laser for the amplitude-modulated signals, and a second laser for the phase-modulated signals. A coupler couples the light from the two lasers together. Preferably, however, a single laser directly next to the phase-modulator is provided. This prevents delay between the laser and the phase-modulator when modes are switched.

The present invention also provides a receiver for receiving optical signals, the optical signals including both phase-modulated optical signals and direct amplitude-modulated optical signals. The receiver includes an interferometer for reading the phase-modulated signals and a detector to read the direct amplitude-modulated optical signals.

The receiver also may read delayed amplitude-modulated optical signals through the interferometer.

Preferably, an energy level detector is also provided at the receiver for measuring light energy in a fiber.

Preferably, the second light path has a delay with respect to the first light path, the delay being matched to a delay at the transmitter during the phase-modulated transmission mode and the delayed second amplitude-modulated mode.

The receiver can read a mixed optical signal of both phase-modulated and direct and delayed amplitude-modulated signals, with the direct amplitude-modulated signals being read off the third path.

The receiver can be set by an operator to receive in one of the three modes, or can be switched to the various receive modes by a bit set in a packet. For example, the current packet being received sets the receiver to the proper receive mode for the next packet.

The present invention also provides a dual-mode optical transmission system comprising a transmitter for transmitting amplitude-modulated signals in a first mode and phase-modulated signals in a second mode, an optical fiber connected to the transmitter, and a receiver having an interferometer being connected to the optical fiber. The first and second mode signals can be read by the receiver, and can be switched based on either an operator input or packet-based data.

The present invention also provides a method for transmitting optical data in two modes comprising the steps of:

phase modulating light from at least one light source during a first transmission mode so as to transmit phase-modulated optical data; and

amplitude modulating light from the at least one light source during a second alternate transmission mode so as to transmit amplitude-modulated optical data.

5 Preferably, the at least one light source is a single laser.

The amplitude modulating step may include amplitude modulating the light as a direct function of an input electronic data stream, or as a function of an output of a delayed-feedback exclusive-or gate.

10 The method may further include switching between the phase modulating and the amplitude modulating steps as a function of a packet bit set.

Also provided by the present invention is an optical signal comprising amplitude-modulated signals representative of an input data stream during a first time period and phase-modulated signals representative of the input data stream during a second time period subsequent or prior to the first time period.

15 It should be understood however that, while phase-modulated signals are preferred in the secure transmission mode, under certain circumstances a mixture of phase and amplitude modulation could be possible. For example, amplitude modulated signals not related to the input optical data stream could be transmitted during the secure phase-modulation mode without necessarily affecting security.

20

BRIEF DESCRIPTION OF THE DRAWINGS

Two preferred embodiments of the present invention are described below by reference to the following drawings, in which:

25 Fig. 1 shows a preferred embodiment of a transmitter of the present invention;

Fig. 2 shows a preferred embodiment of a receiver of the present invention; and

Fig. 3 shows details a packet for possible use with the transmitter of the present invention

30

DETAILED DESCRIPTION

Fig. 1 shows a preferred embodiment of a dual-mode transmitter 10 according to the present invention for transmitting signals to an optical fiber 20. Transmitter 10

includes a single laser 12, for example a semiconductor laser emitting a narrow band of light at approximately 1550nm, or at other wavelengths. Light emitted from laser 12 passes through a phase modulator 16, for example a Mach-Zender phase modulator, directly next to or part of the same package as laser 12. The light may be depolarized by a depolarizer 14. An electronic controller 18, for example a PLC, controls phase modulator 16 and the amplitude of the light output of laser 12, for example through pulsing the laser.

Controller 18 directs the input data DSI to a direct amplitude modulation circuit 80 and to a circuit 82 having a delayed-feedback exclusive-or gate 118. Input data DSI forms one input of exclusive-or gate 118. The other input of the delayed-feedback exclusive-or gate 118 is a feedback loop 119, which feeds back the output of exclusive-or gate 118, and has an electronic delay circuit 120, which causes a delay, for example, a certain number of bits later. Delayed-feedback exclusive-or gate 118 outputs the output electronic data stream OP. The data OP exiting circuit 82 is directed both to a switch 84 and a phase modulator controller 86. Direct circuit 80 also supplies an input with data DSI to switch 84.

The output of switch 84 is directed to an amplitude controller 88 for laser 12, which during an amplitude modulation mode is modulated according to the output from switch 84. Amplitude controller 88, during an amplitude-modulation mode, thus amplitude modulates the laser 12 so that an amplitude-modulated signal 23, representative of either the data DSI or OP, passes to fiber 20.

During an amplitude modulation mode, phase modulator controller 86 either does not phase modulate the light, or phase modulates based upon the output of the delayed feedback exclusive-or circuit 82.

When switch 84 receives data from circuit 82, the laser amplitude is a function of the output OP of the delayed-feedback exclusive-or gate 118. The transmitter 10 thus transmits in a delayed-feedback exclusive-or amplitude-modulated mode, defined herein as the delayed amplitude-modulated mode. When switch 84 receives data DSI from direct circuit 80, the laser amplitude is a direct function of the input electronic data DSI. The transmitter 10 thus transmits in the direct amplitude-modulated mode.

During the alternate phase-modulation mode, the amplitude controller 88 directs the laser to emit constant wavelength, non-pulsed light. Depending on the

output OP of circuit 82, phase modulator 16 then either imparts a known initial phase shift to the light which could be 0 degrees or else imparts another known offset phase shift preferably equal to the known initial phase shift + 180 degrees on the light passing through phase modulator 16. An optical signal 22, which represents a stream of binary bits, is thus created. Optical signal 22 is transmitted over fiber 20. This signal provides a secure data transmission mode. The phase-modulated signal must be read with an interferometer having a proper delay path, and any tap to obtain enough light to read the phase-modulated signal is easily detectable.

In the direct amplitude modulated mode, a standard receiver can read the signals 23.

In the delayed amplitude modulated mode, signals OP are sent in a pulsed fashion. These signals can be read by the receiver disclosed in incorporated-by-reference U.S. Patent Application No. 09/765153, entitled "Secure Fiber Optics Telecommunications System and Method" and filed on January 17, 2001. A standard receiver with a photodiode also could read the delayed amplitude modulated signals. The photodiode output could then be split into two legs, with one leg having a delay, which must be similar to the delay 120 in the delayed-feedback exclusive-or gate 118. The two legs are then passed through an exclusive-or gate to obtain the proper signal DSI.

In the phase-modulated mode, the phase-modulated signals 22 can read by the receiver disclosed in incorporated-by reference U.S. Patent Application No. 09/765153, entitled "Secure Fiber Optics Telecommunications System and Method" and filed on January 17, 2001. The signals 22 pass through a splitter, with one path having an optical delay similar to the delay 120. The light recombines in a coupler so that input stream DSI can be reconstituted.

Receiver 10 shown in Fig. 2 is a preferred embodiment permitting three modes. However, the present invention also encompasses a transmitter with the phase-modulated mode and only one of the direct and delayed amplitude-modulated modes. A transmitter with the phase-modulated mode and the direct amplitude-modulated mode only, for example, is backwards-compatible with existing receivers in the amplitude-modulated mode and yet can provide a secure and non-secure mode with receivers having an interferometer as disclosed herein. A transmitter with the

phase-modulated mode and the delayed amplitude-modulated mode only provides secure and non-secure modes and is compatible for both modes with the receiver disclosed in U.S. Patent Application No. 09/765,153, entitled "Secure Fiber Optics Telecommunications System and Method" and filed on January 17, 2001.

The present invention also provides a receiver compatible with existing transmitters, with the transmitter disclosed in U.S. Patent Application No. 09/765,153, entitled "Secure Fiber Optics Telecommunications System and Method" and filed on January 17, 2001, and with the transmitter of the present invention.

As shown in Fig. 2, receiver 30 can receive either direct or delayed amplitude-modulated signals as well as phase-modulated signals. Receiver 30 includes a coupler/splitter 31, functioning as a splitter. Splitter 31 splits off a portion of the light, directing part of the optical energy to an energy level or tap detector 33 and passes the remaining light to a second coupler/splitter 32.

Splitter 32 splits light to a photodiode 35 for converting amplitude-modulated optical signals into electrical signals. The receiver also has an interferometer 40 receiving the rest of the light from splitter 32. The interferometer 40 has a coupler/splitter 34, functioning as a splitter, and a coupler/splitter 36, functioning as a coupler.

Detector 33 monitors, during the phase-modulation transmission mode, the light energy in the fiber 20 via the light energy coupled to the detector by splitter 31. If the amplitude drops during this mode, most likely from a tap, the detector alerts the receiver and can, for example, sound an alarm or alert network maintenance personnel. Additionally, since the receiver is generally part of a component box, which also includes a transmitter, the component box transmitter can send a signal back to the component box containing transmitter 10 so as to instruct transmitter 10 to stop sending data, or to send data over a standby fiber. During an amplitude-modulation transmission mode, the detector 33 can be set to a different trip level.

Optical signals 22, 23 in fiber 20, after passing splitter 31 and splitter 32, enter interferometer 40 at an input 41 of splitter 34. Splitter 34 splits the light entering input 41, so that the signals 22, 23 travel over both a first fiber 43 and a second fiber

45. A depolarizer 48 may depolarize light passing through fiber 43, preferably, or fiber 45 as an alternative. Second fiber 45 includes a delay fiber 46 which may include a fiber loop of a desired length. Delay fiber 46 then provides an input to coupler 36 which recombines the delayed signal with the non-delayed signal propagating through fiber 43 and depolarizer 48 at output 42. The physical delay imposed by the interferometer 40 in the second light path through fiber 45, with its delay loop 46, with respect to light passing through the first light path through fiber 43 and depolarizer 48 is selected to match as closely as possible an electronic delay time imposed by electronic delay circuit 120 of the controller 18. If the first path in the interferometer 40 has a length L1 and the second path a length L2, the length L2 is selected, preferably by sizing loop 46, as a function of L1, the speed of light v in fibers 43 and 45, the light propagation delay through the depolarizer 48, DPD, and the electronic delay time ED. The speed of light in the fibers may be estimated as a function of the wavelength and the type of fiber used. The length L1 is known. When depolarizer 48 is in path 43, L2 is then chosen to approximate, and preferably equal, the amount $(ED+DPD)*v + L1$.

The phase-modulated signals 22 recombining at output 42 thus recombine the signal OP with a delayed signal OPD, delayed by an amount of time equivalent to the electronic delay time ED. If the data in the OP and OPD signals each represents a zero, or each represents a one, at the inputs 44 and 47 to coupler 36, the signals 22 will destructively interfere when recombined at output 42 of coupler 36. Output detector 38 then detects no light and produces a zero signal. If one of the data bits in the OP and OPD signals represents a zero and the other one represents a one, at the inputs 44 and 47 to coupler 36, the signals will constructively interfere when recombined at coupler output 42. This is true for both phase-modulated and amplitude-modulated signals. Output detector 38 then detects light and produces an electronic signal representative of a one. When receiving phase-modulated signals or the delayed amplitude-modulated signals, detector 38 thus outputs the input data stream DSI. A filter 50 can be provided to filter out noise or other minor inaccuracies in the recombination of the signals. This stream is transmitted via a switch 39 to output 37.

The interferometer 40 comprising coupler/splitter 34 and 36, fibers 43 and 45,

delay fiber 46, and depolarizer 48 functions as an optical exclusive-or gate with one input leg delayed for signals arriving at input 41 of coupler 34. Interferometer 40 as a whole thus optically and physically "decodes" the signal OP produced by the delayed-feedback exclusive-or gate 118.

5 When receiving direct amplitude modulated signals, the detector outputs a signal that is meaningless. Switch 39 is thus set to receive an input from photodiode 35, which is representative of stream DSI, and thus stream DSI is sent to output 37.

The receiver of the present invention thus can receive both direct amplitude-modulated signals and phase-modulated signals. The receiver 30 also could include a circuit after photodiode 35 so as to convert the delayed amplitude-modulated signals to the stream DSI. In this case, the output detector 38 would only be used to read the phase-modulated signals.

Controlling of the change between secure mode and the amplitude-modulated modes can function in a variety of ways, depending on the overall system configuration. With the transmitter 10 and the receiver 30, an operator can configure the transmitter 10 and receiver 30 so that the system functions in any of the three modes.

15 If the system includes a dual-mode transmitter (defined herein as a transmitter with a phase-modulation mode and one or more amplitude-modulation modes), an input packet data bit also could be used to set the mode.

Signal 25 in Fig. 2 is shown as a combination of amplitude-modulated signals 23 and phase-modulated signals 22, which occurs for example when packets with different modes are sent one after another.

Fig. 3 shows an example of such a packet 200 having a data payload 201, and address 202, and mode data 203. Depending on the mode data, the transmitter transmits in a phase-modulated or amplitude-modulated mode. If the transmitter is similar to transmitter 30, the mode data further includes whether to amplitude-modulate in direct or delayed mode. Preferably, the mode data 203 is set not for its own packet N, but for the following packet N+1, thus providing a buffer time for the receiver to change modes. Thus, when packet N+1 is received, the receiver is set to the proper receive mode. The mode data could also be set more than one packet ahead, for example N+2.

If both a dual mode transmitter and a dual mode receiver are used in a system, a telecommunications service provider thus could charge certain customers for an enhanced secure mode service for their packet-based data, while permitting other customers to send data in a non-secure mode in their packets.

5 An alternate embodiment of the transmitter of the present invention can include two lasers, with the first laser being controlled during the amplitude modulation modes. The second laser is a continuous wave laser modulated by a phase modulator in the alternate secure mode. A coupler couples the light from the first laser and second lasers together, so that the optical signal for either mode travels over
10 a single fiber.

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WHAT IS CLAIMED IS:

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9X

1. An optical data transmitter comprising:
at least one light source;
5 a phase modulator for phase modulating light from the light source; and
a controller having an input for receiving an electronic data stream, the
controller in a first mode controlling the phase modulator so as to create phase-
modulated optical signals in the light as a function of the electronic data stream and
the controller in a second alternate mode amplitude-modulating the light as a function
10 of the electronic data stream.
2. The transmitter as recited in claim 1 wherein the controller in the first mode
preferably phase-modulates the light as a function of an output of a delayed-feedback
exclusive-or gate having the electronic data stream as an input.
- 15 3. The transmitter as recited in claim 1 wherein the controller in the second mode
amplitude modulates the light in direct relation to the input data stream.
4. The transmitter as recited in claim 1 wherein the controller in the second mode
20 amplitude modulates the light as a function of an output of a delayed-feedback
exclusive-or gate having the electronic data stream as an input.
5. The transmitter as recited in claim 1 wherein the controller has a switch for
switching between the first and second modes.
- 25 6. The transmitter as recited in claim 5 wherein the switch is operator-activated.
7. The transmitter as recited in claim 1 wherein the switch is bit-data activated.
- 30 8. The transmitter as recited in claim 7 wherein bit data contained in a packet
activates the switch.

9. The transmitter as recited in claim 1 wherein the at least one light source is a single laser.

11. The transmitter as recited in claim 1 wherein during the second mode the phase-modulator provides a constant or no phase-modulation change.

an interferometer for reading the phase-modulated signals; and a detector to read the direct amplitude-modulated optical signals.

14. The receiver as recited in claim 13 wherein the switch is operator-controlled.

16. The receiver as recited in claim 12 wherein the interferometer receives delayed amplitude-modulated optical signals.

18. A dual-mode optical transmission system comprising:
a transmitter for transmitting amplitude-modulated signals in a first mode and phase-modulated signals in a second mode;
an optical fiber connected to the transmitter; and

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a receiver having an interferometer being connected to the optical fiber.

19. A method for transmitting optical data in two modes comprising the steps of:
phase modulating light from at least one light source during a first
transmission mode so as to transmit phase-modulated optical data; and
amplitude modulating light from the at least one light source during a second
alternate transmission mode so as to transmit amplitude-modulated optical data.

20. The method as recited in claim 19 wherein during the first transmission mode the
light is not amplitude-modulated.

21. The method as recited in claim 19 wherein during the second alternate
transmission mode the light is both amplitude-modulated and phase-modulated.

22. An optical signal comprising amplitude-modulated signals representative of an
input data stream during a first time period and phase-modulated signals
representative of the input data stream during a second time period subsequent or
prior to the first time period.

ABSTRACT

An optical data transmitter includes at least one light source, a phase modulator for phase modulating light from the light source, and a controller having an input for receiving an electronic data stream, the controller in a first mode controlling the phase modulator so as to create phase-modulated optical signals in the light as a function of the electronic data stream and the controller in a second alternate mode amplitude-modulating the light as a function of the electronic data stream. A dual-mode receiver, an optical data transmission system and a dual-mode optical signal are also disclosed.

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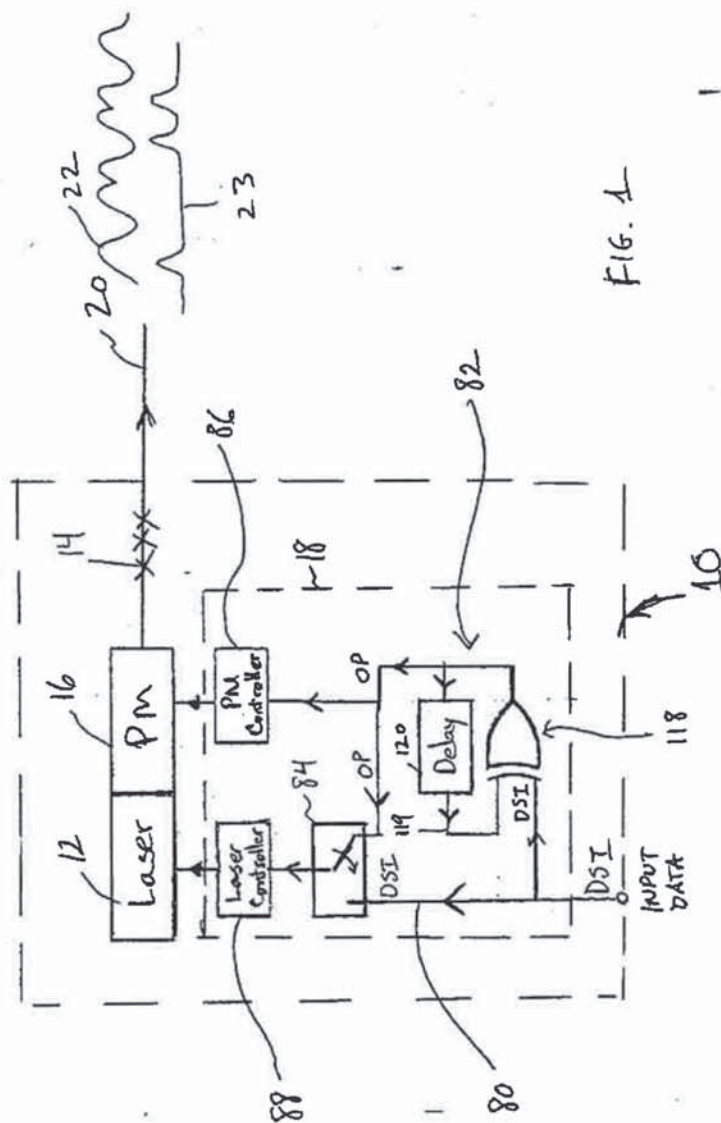


FIG. 1

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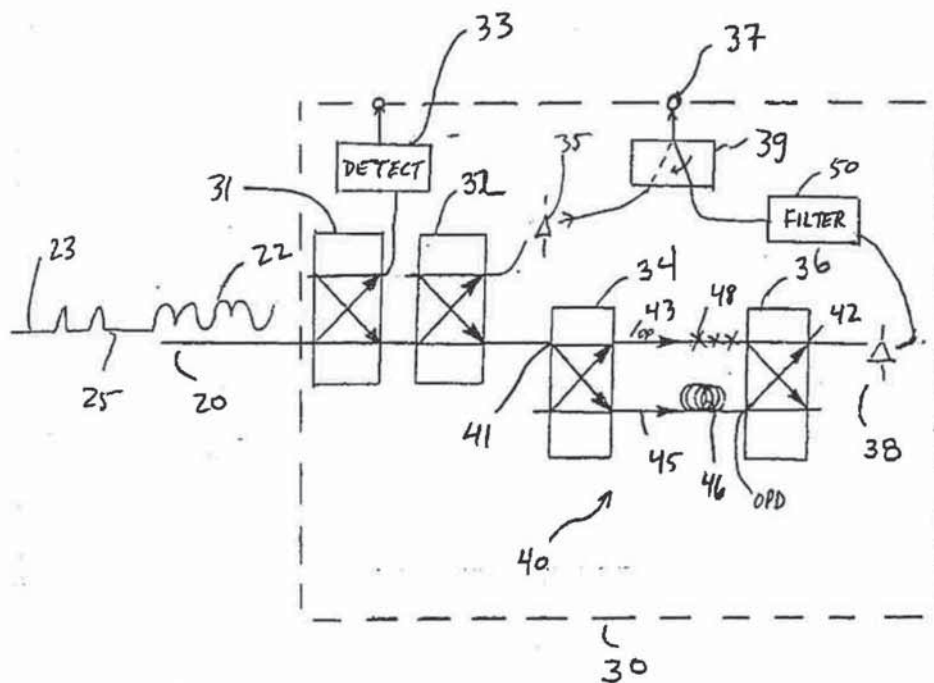


FIG. 2

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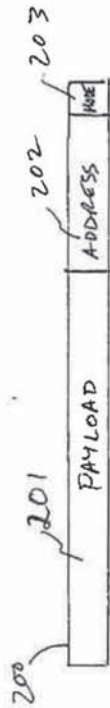


FIG. 3

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AS ORIGINALLY FILE

0972018.01027760

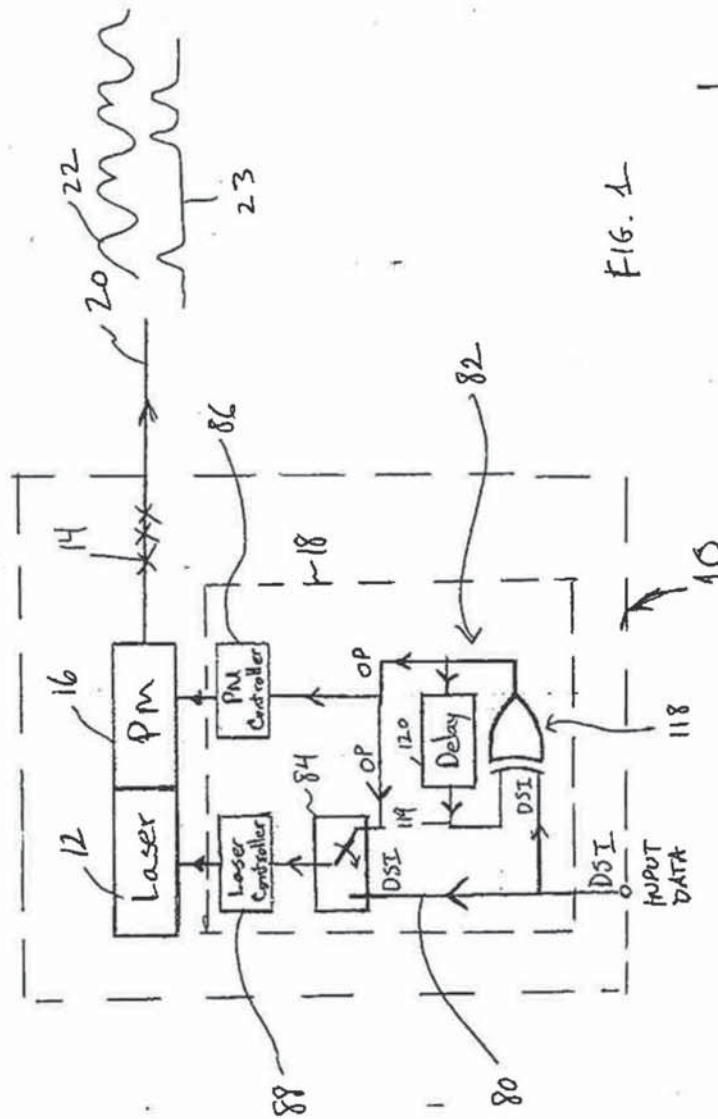


FIG. 1

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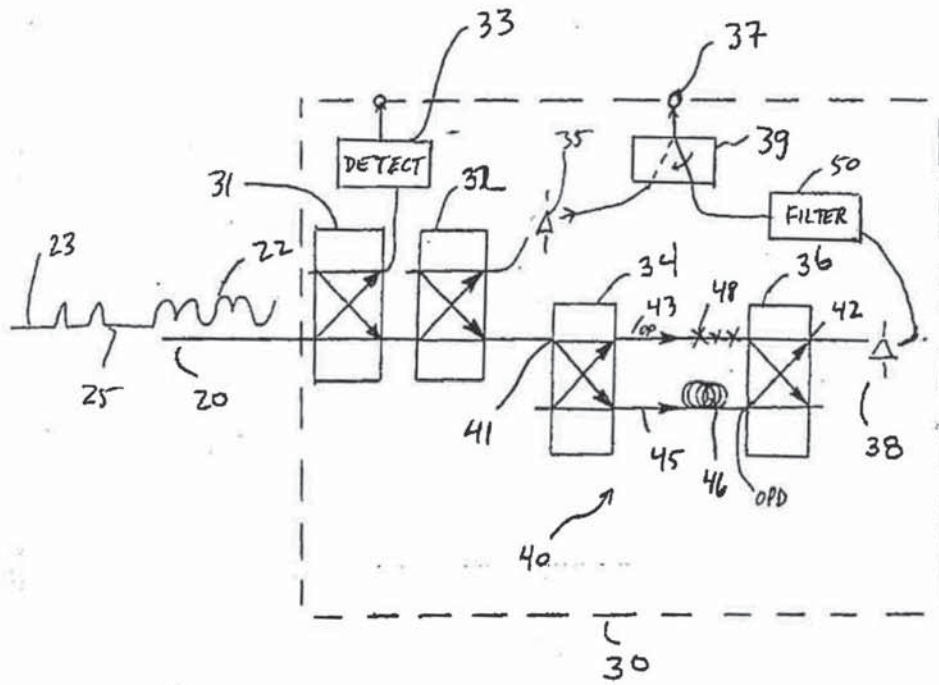


FIG. 2

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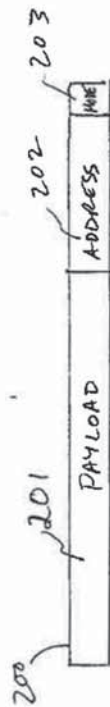


FIG. 3

106210-8102760

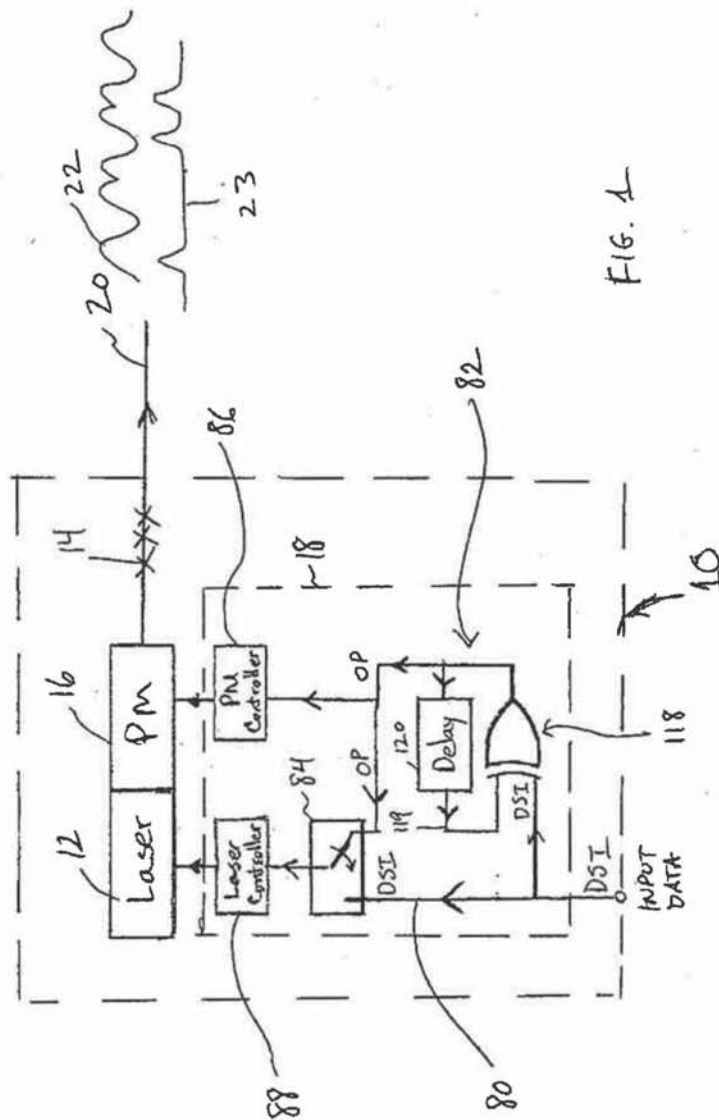


FIG. 1

09772018.012901

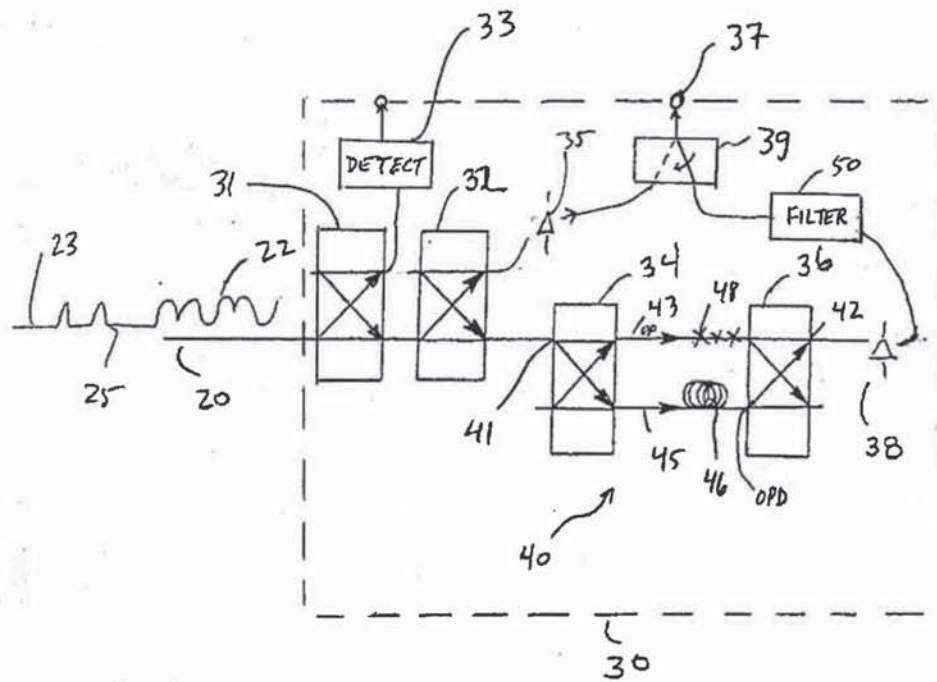


FIG. 2

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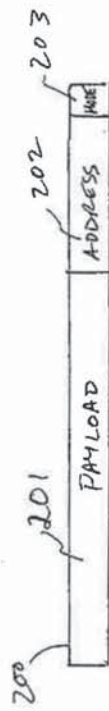


FIG. 3

Docket No.: 514,1002**DECLARATION AND POWER OF ATTORNEY**

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled: **DUAL-MODE FIBER OPTIC TELECOMMUNICATIONS SYSTEM AND METHOD**, the specification of which (check one)☒ is attached hereto☐ was filed on _____ as Application Serial No. _____ and was amended on _____ (if applicable).☐ I hereby authorize and request our attorney, Davidson, Davidson & Kappel, LLC, of 1140 Avenue of the Americas, New York, New York 10036 to insert here in parentheses (Application number _____, filed _____, the filing date and application number of said application when known.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendments referred to above.

I acknowledge the duty to disclose all information which is known to me to be material to the patentability of this application as defined in Title 37, Code of Federal Regulations, '1.56.

I hereby claim foreign priority benefits under Title 36, United States Code, '119 of any foreign and/or provisional application(s) for patent or inventor's certificate listed below and have also identified below any foreign and/or provisional application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed.

PRIOR APPLICATION(S)

Priority claimed

(Number)	(Country)	(Day/Month/Year Filed)	Yes	No

I hereby claim the benefit under Title 35, United States Code, '120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 36, United States Code, '112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, '1.56(b) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

(Application Serial Number)	(Filing Date)	(Status) (patented, pending, abandoned)

And I hereby appoint Clifford M. Davidson, Registration No. 82,728; Leslye B. Davidson, Registration No. 88,834; Cary S. Kappel, Registration No. 86,561; William C. Gehris, Registration No. 38,168; Julie L. Bowker, Registration No. 37,870; Morey B. Wiles, Registration No. 36,968; Robert J. Panfilio, Registration No. 41,240; Scott L. Appelbaum, Registration No. 41,587; Cynthia R. Moore, Registration No. 46,086 and David Knashik, Registration No. 45,991 my attorneys, with full power of substitution and reversion, to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith; correspondence address: DAVIDSON, DAVIDSON & KAPPEL LLC, 1140 Avenue of the Americas, 15th Floor, New York, New York 10036; Telephone: (212) 997-1028; Fax: (212) 997-1037.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of sole or first

Inventor Peter Spawordt

Inventor's signature

Date

Residence Melbourne Beach, FLCitizenship USPost Office Address 397 Lighthouse DriveMelbourne Beach, FL

Full name of joint

Inventor, if any

Third Inventor's signature

Date

Residence (city) _____ (state or country)

Citizenship

Post Office Address:

Full name of joint

Inventor, if any

Second Inventor's signature

Date

Residence (city) _____ (state or country)

Citizenship

Post Office Address:

Full name of joint

Inventor, if any

Fourth Inventor's signature

Date

Residence (city) _____ (state or country)

Citizenship

Post Office Address:

Application Assignment Record

According to the application transmittal letter, an assignment recording ownership was filed with this application; however, a copy of this record was not located in the original file history record obtained from the United States Patent and Trademark Office. Upon your request, we will attempt to obtain the assignment documents from the Assignment Recordation Branch of the United States Patent and Trademark Office or from a related application case (if applicable). Please note that additional charges will apply for this service.

This page is not part of the official USPTO record. It has been determined that content identified on this document is missing from the original file history record.

#2
8/9/772.6/18
Sheet 1 of 1

FORM PTO-1449 (REV. 7-80)	U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE	ATTY. DOCKET NO.: 514.1002	SERIAL NO.: not yet assigned
LIST OF PRIOR ART CITED BY APPLICANT (Use several sheets if necessary)		APPLICANT(S): SNAWEROT	
		FILING DATE: Herewith	GROUP: not yet assigned

JCS44 U.S. PTD
09/772018
01/29/01

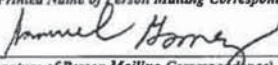
U.S. PATENT DOCUMENTS												
*EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE					
cl	AA	5 2 2 3 9 6 7	6/28/93	Udd	359	118						
cl	AB	5 8 0 6 4 4 6	2/25/97	Davis et al.	359	173						
cl	AC	5 4 5 5 8 9 8	10/3/95	Udd	359	119						
cl	AD	6 0 7 2 6 1 5	6/6/2000	Mamryshov	359	183						
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	AF											
	AG											
	AH											
	AI											
	AJ											
	AK											

FOREIGN PATENT DOCUMENTS									
		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION		
							YES	NO	
	AL								
	AM								
	AN								
	AO								
	AP								

OTHER PRIOR ART (Including Author, Title, Date, Pertinent Pages, Etc.)	
AR	
AS	
AT	

EXAMINER <i>Christina Y. Huang</i>	DATE CONSIDERED <i>6-26-02</i>
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*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609;
 Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

CERTIFICATE OF MAILING Y "EXPRESS MAIL" (37 CFR 1.1) Applicant(s): Peter SNAWERDT		Docket No. 514.1002	
Serial No. To Be Assigned	Filing Date Herewith	Examiner To Be Assigned	Group Art Unit To Be Assigned
Invention: DUAL-MODE FIBER OPTIC TELECOMMUNICATIONS SYSTEM AND METHOD			
<div style="float: right; text-align: right; font-size: small;"> 3944 U.S. PTO 09/772018 01/23/01 </div> <p>I hereby certify that the following correspondence:</p> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p>New Utility Patent Application and Accompanying Documents</p> </div> <p style="text-align: center; font-size: x-small;">(Identify type of correspondence)</p> <p>is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 in an envelope addressed to: The Assistant Commissioner for Patents, Washington, D.C. 20231 on</p> <div style="margin-left: 100px;"> <p><u>January 29, 2001</u></p> <p style="font-size: x-small;">(Date)</p> </div> <div style="margin-left: 300px; margin-top: 20px;"> <p><u>Samuel Gomez</u></p> <p style="font-size: x-small;">(Typed or Printed Name of Person Mailing Correspondence)</p> <p></p> <p style="font-size: x-small;">(Signature of Person Mailing Correspondence)</p> <p><u>EL 743202993 US</u></p> <p style="font-size: x-small;">("Express Mail" Mailing Label Number)</p> </div>			

Note: Each paper must have its own certificate of mailing.

POSA/REV02

File History Content Report

The following content is missing from the original file history record obtained from the United States Patent and Trademark Office. No additional information is available.

Document Date - 2001-04-11

Document Title - USPTO Communication Re: Change of Address

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FORM PTO-1083



ASSISTANT COMMISSIONER FOR PATENTS
Washington, DC 20231

Docket No.: 544,1002
Date: June 22, 2001

In re application of: **Peter SNAWERDT**
Serial No.: **09/772,018**
Filed: **January 29, 2001**
For: **DUAL-MODE FIBER OPTIC TELECOMMUNICATIONS SYSTEM AND METHOD**

Sir:

Transmitted herewith is a **Petition to Make Special Under 37 CFR 1.102(d)** in the above-identified application.

- ☐ Small entity status under 37 C.F.R. 1.9 and 1.27 has been previously established.
☐ Applicants assert small entity status under 37 C.F.R. 1.9 and 1.27.
☒ No fee for additional claims is required.
☐ A filing fee for additional claims calculated as shown below, is required:

		(Col. 1)		(Col. 2)	SMALL ENTITY		OR	LARGE ENTITY	
FOR:	REMAINING	AFTER	PREVIOUSLY	PRESENT	RATE	FEE		RATE	FEE
	AMENDMENT	PAID FOR	EXTRA						
TOTAL CLAIMS	* Minus**	=	0		x \$	9		x \$	18
INDEP. CLAIMS	* Minus***	=	0		x \$	40		x \$	80
() FIRST PRESENTATION OF MULTIPLE DEP. CLAIM					+	\$135		+	\$270

TOTAL: \$ OR TOTAL: \$

- * If the entry in Co. 1 is less than the entry in Col. 2, write "0" in Col. 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, write "20" in this space.
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, write "3" in this space.

- ☒ Also transmitted herewith are:
☐ Petition for extension under 37 C.F.R. 1.136 (in duplicate)
☒ Other: **Supplemental Information Disclosure Statement, Form PTO-1449 & Attachments**
- ☒ Check(s) in the amount of **\$130.00** is/are attached to cover:
☐ Filing fee for additional claims under 37 C.F.R. 1.16
☐ Petition fee for extension under 37 C.F.R. 1.136
☒ Other: **Petition to Make Special Under 37 CFR 1.102(d)**
- ☒ The Assistant Commissioner is hereby authorized to charge payment of the following fees associated with this communication or credit any overpayment to Deposit Account No. 50-0552.
- ☒ Any filing fee under 37 C.F.R. 1.16 for the presentation of additional claims which are not paid by check submitted herewith.
- ☒ Any patent application processing fees under 37 C.F.R. 1.17.
- ☒ Any petition fees for extension under 37 C.F.R. 1.136 which are not paid by check submitted herewith, and it is hereby requested that this be a petition for an automatic extension of time under 37 CFR 1.136.

William C. Gehris
William C. Gehris, Reg. No. 38,156
DAVIDSON, DAVIDSON & KAPPEL, LLC
485 Seventh Avenue, 14th Floor
New York, New York 10018
Tel: (212) 736-1940
Fax: (212) 736-2427

I hereby certify that this correspondence and/or documents referred to as attached therein and/or fee are being deposited with the United States Postal Service as "first class mail" in an envelope addressed to "Assistant Commissioner for Patents, Washington, D.C. 20231" on June 22, 2001.

DAVIDSON, DAVIDSON & KAPPEL, LLC
BY: *Barbara E. Fortini*
Barbara E. Fortini



UNITED STATES PATENT & TRADEMARK OFFICE

#3/ald
514.1002 - Accel.
Special - Examint
7-9-01

Re: Application of: Peter SNAWERDT
Serial No.: 09/772,018
Filed: January 29, 2001
For: DUAL-MODE FIBER OPTIC
TELECOMMUNICATIONS SYSTEM AND METHOD

JUL 10 2001
Technology Center 2600

PETITION TO MAKE SPECIAL UNDER 37 CFR 1.102(d)

BOX: PETITIONS
Commissioner for Patents
Washington, D.C. 20231

June 22, 2001

Sir:

Applicant hereby petitions under 37 CFR 1.102(d) to have the above-identified application made special under the Accelerated Examination procedure of MPEP 708.02, Part VIII.

Attached to this petition is the 37 CFR 1.17(i) fee of \$130.00. If any additional fees are deemed to be due at this time, the Commissioner is authorized to charge payment of the same to Deposit Account No. 50-0552.

Applicant states the following:

(1) It is respectfully submitted that all claims are directed to a single invention; and

(2) A pre-examination search was made using the US PTO patent searchable on-line database at <http://www.uspto.gov>. A word search in the all years database was performed on January 8, 2001 as follows: (((ACLM/"phase modulator" AND optical) AND "data transmission") AND interferometer). The following references were deemed most relevant from this search: U.S. Patent Nos. 5,223,967, 5,606,446, and 5,455,698. A further reference, U.S. Patent No. 5,072,615, was uncovered in a separate on-line search. All of these references have been made of record in the present application by virtue of a Form PTO-1449.

In addition, a further pre-examination search was made using the US PTO patent searchable on-line database at <http://www.uspto.gov>. A word search in the all years database was performed on June 6, 2001 as follows: ("amplitude modulated" AND "phase modulated optical signal"). A copy of the reference deemed most relevant, U.S. Patent No. 6,243,505, is

submitted with the Information Disclosure Statement filed herewith. U.S. Patent No. 5,726,784 was uncovered during a separate search.

DETAILED DISCUSSION OF THE REFERENCES

Claim 1 recites an optical data transmitter with a light source and a controller having an input for receiving data from an electronic data stream. The controller in a first mode controls the phase-modulator to create phase-modulated signals as a function of the electronic data stream, and in an alternate second mode amplitude-modulating the light as a function of the electronic data stream.

None of the references disclose such a dual mode system as claimed.

Amplitude-modulated signals are common in the prior art, as for example in U.S. Patent No. 5,726,784 which uses a phase-modulator to create the amplitude modulated signal. U.S. Patent Nos. 5,223,967 and 5,455,698 disclose phase-modulating data on an optical loop in a Sagnac-based-interferometer system. It is respectfully submitted that one of skill in the art would not have combined the phase-modulating Sagnac-interferometer-based systems of U.S. Patent Nos. 5,223,967 and 5,455,698 with amplitude-modulating systems so as to create a dual-mode system, since the Sagnac-interferometer-based systems have a light source at the receiver, while the other amplitude-based systems have a light source at the transmitter. U.S. Patent No. 6,243,505 discloses the use of a phase modulator to reduce Brillouin Scattering. This phase-modulation is not used to send data as a function of an electronic data stream as in claim 1, but merely to broaden the spectrum of the signal beyond the coherence band of Brillouin scattering. Dual alternate transmission modes are not disclosed.

With respect to independent claim 12, none of the references discloses a receiver receiving optical signals, the optical signals including both phase-modulated and amplitude-modulated signals and the receiver having an interferometer and a detector. The receiver of the Sagnac-interferometer-based systems does not receive amplitude-modulated signals, and the receiver of the amplitude-based systems does not receive phase-modulated signals or have an interferometer, as claimed in claim 12. U.S. Patent No. 6,243,505 does not show an interferometer at the receiver.

With respect to claim 18, the prior art references do not disclose systems with a

transmitter for transmitting in two modes as claimed and as discussed with respect to claim 1, and with a receiver with an interferometer as discussed with respect to claim 12.

With respect to claim 19, the prior art references do not disclose transmitting in a first phase-modulating mode and a second alternate amplitude-modulated mode as claimed and as discussed above with respect to claim 1.

With respect to claim 22, the prior art references do not disclose an optical signal with phase-modulating signals representative of an input data stream during one time period and amplitude-modulated mode signals representative of an input data stream during another time period as discussed above with respect to claim 1.

CONCLUSION

It is respectfully submitted that the petition for special status be granted. The application is respectfully believed to be in condition for allowance and applicant respectfully requests such action.

Respectfully submitted,

DAVIDSON, DAVIDSON & KAPPEL, LLC

By William C. Gehris
William C. Gehris (Reg. No. 38,156)

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510.1002

UNITED STATES PATENT AND TRADEMARK OFFICE

Re: Application of: Peter SNAWERDT
Serial No.: 09/772,018
Filed: January 29, 2001
For: DUAL-MODE FIBER OPTIC
TELECOMMUNICATIONS SYSTEM AND METHOD

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

June 22, 2001

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Technology Center LLC

Sir:

In accordance with the provisions of 37 C.F.R. § 1.97, Applicant hereby makes of record the documents listed on the accompanying PTO-1449 Form (1 page) for consideration by the Examiner in connection with the examination of the above-identified patent application.

This Information Disclosure Statement is filed under 37 C.F.R. §1.97 (b), before the mailing date of a First Office Action, therefore no fee is believed due.


In the event any additional fee is due in connection with this response or if any fee has been overpaid, the deficiency or overpayment should be charged to our Deposit Account No. 50-0552.

510.1002

It is respectfully requested that the references cited in the accompanying PTO-1449 form be considered and made of record. It is respectfully submitted that the pending claims are patentable over all of the references made of record at this time.

Respectfully submitted,

DAVIDSON, DAVIDSON & KAPPEL, LLC

By: 
William C. Gehris
Reg. No. 38,156

DAVIDSON, DAVIDSON & KAPPEL, LLC
485 Seventh Avenue, 14th Floor
New York, New York 10018
(212) 763-1940

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FORM PTO-1449
(REV. 7-80)

U.S. DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICE

ATTY. DOCKET NO.:
514.1002

SERIAL NO.: not yet assigned

LIST OF PRIOR ART CITED BY APPLICANT
(Use several sheets if necessary)



APPLICANT(S): SHAWERDT

FILING DATE: Herewith

GROUP: not yet assigned

U.S. PATENT DOCUMENTS

*EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
cl	AA	6 2 4 3 5 0 5	6/5/01	Bosso et al.	385	2	Feb 17, 2000
cl	AB	5 7 2 6 7 8 4	3/10/98	Alexander et al	359	125	
	AC						
	AD						
	AE						
	AF						
	AG						
	AH						
	AI						
	AJ						
	AK						

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FOREIGN PATENT DOCUMENTS

	DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION
						YES NO
	AL					
	AM					
	AN					
	AO					
	AP					

OTHER PRIOR ART (Including Author, Title, Date, Pertinent Pages, Etc.)

AR	
AS	
AT	

EXAMINER

Christina Y. Huang

DATE CONSIDERED

6-26-02

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609;

Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

JUL 11 2001 2:08PM DDK

NO. 6160 P. 1/15

CLIFFORD M. DAVIDSON
LESLIE R. DAVIDSON
CARY S. KAPPEL
WILLIAM C. GEHRIS
MOREY B. WILDES
ROBERT L. PARADISO
ERIK R. SWANSON

THOMAS P. CANTY
LIVIA S. BOYADJIAN

SCOTT L. APPELBAUM
CYNTHIA R. MOORE, PH.D.
DAVID G. KNASIAK
RICHARD V. ZANZALARI
SALVATORE J. MAIORINO
ROY L. CHAN



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FRANKFURT@DDKPATENT.COM

*ADMITTED IN NEW JERSEY ONLY
-DDK EUROPE

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FROM: William Gehris (Reg No. 38,156)

DATE: July 11, 2001

OUR REF: 514. 1002 *WGH*

NO. OF PAGES (including cover): 15

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Krista Zele

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#4

514.1002

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

Re: Application of: Peter SNAWERDT
Serial No.: 09/772,018
Filed: January 29, 2001
For: DUAL-MODE FIBER OPTIC
TELECOMMUNICATIONS SYSTEM AND METHOD

SUPPLEMENT TO PETITION TO MAKE SPECIAL UNDER 37 CFR 1.102(d)

BOX: PETITIONS
Commissioner for Patents
Washington, D.C. 20231

July 11, 2001

Sir:

Applicant hereby provides the following supplemental information to the petition under 37 CFR 1.102(d) to have the above-identified application made special under the Accelerated Examination procedure of MPEP 708.02, Part VIII.

Applicant states the following:

- (1) It is respectfully submitted that all claims are directed to a single invention. If the Office determines otherwise, applicant will make an election without traverse.
- (2) An additional pre-examination search of class 385, subclass 2 and class 359, subclasses 125 and 179 was made. A new Information Disclosure Statement is being submitted to disclose U.S. Patent No. 5,822,102. Other references deemed most relevant from the search are of record.

DETAILED DISCUSSION OF THE REFERENCES

Claim 1 recites an optical data transmitter with a light source and a controller having an input for receiving data from an electronic data stream. The controller in a first mode controls the phase-modulator to create phase-modulated signals as a function of the electronic data stream, and in an alternate second mode amplitude-modulating the light as a function of the electronic data stream.

U.S. Patent No 5,822,102 discloses a CAP-based signal, which is a carrierless AM/PM signal. CAP signals does not alternately send an amplitude-modulated signal and then a phase-

modulated signal, but rather sends a combined analog signal. The optical fiber is an analog optical fiber.

With respect to independent claim 12, none of the references discloses a receiver receiving optical signals, the optical signals including both phase-modulated and amplitude-modulated signals and the receiver having an interferometer and a detector. U.S. Patent No. 5,822,102 does not disclose a receiver having an interferometer.

With respect to claim 18, the '102 patent does not disclose systems with a transmitter for transmitting in two modes as claimed and as discussed with respect to claim 1, and with a receiver with an interferometer as discussed with respect to claim 12.

With respect to claim 19, the '102 patent does not disclose transmitting in a first phase-modulating mode and a second alternate amplitude-modulated mode as claimed and as discussed above with respect to claim 1.

With respect to claim 22, the '102 patent does not disclose an optical signal with phase-modulating signals representative of an input data stream during one time period and amplitude-modulated mode signals representative of an input data stream during another time period as discussed above with respect to claim 1.

CONCLUSION

It is respectfully submitted that the petition for special status be granted. The application is respectfully believed to be in condition for allowance and applicant respectfully requests such action.

Respectfully submitted,

DAVIDSON, DAVIDSON & KAPPEL, LLC

By 

William C. Gehris (Reg. No. 38,156)

Davidson, Davidson & Kappel, LLC
485 Seventh Avenue, 14th Fl.
New York, New York 10018
(212) 736-1940

I hereby certify that this correspondence and/or documents referred to as attached hereto and / or fee are being furnished transmitted to the United States Patent And Trademark Office (US 745 5919) on July 11, 2001.
DAVIDSON, DAVIDSON & KAPPEL, LLC.

BY: 

William C. Gehris (Reg. No. 38,156)

JUL 11 2001 2:09PM DDK

NO. 6160 P. 4/15

514.1002

UNITED STATES PATENT AND TRADEMARK OFFICE

Examiner: To Be Assigned Art Unit: 2633
Re: Application of: Peter SNAWERDT
Serial No.: 09/772,018
Filed: January 29, 2001
For: DUAL - MODE FIBEROPTIC
TELECOMMUNICATIONS SYSTEM AND
METHOD

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

Assistant Commissioner for Patents
Washington, D.C. 20231
BOX: NO FEE

July 11, 2001


Sir:

In accordance with the provisions of 37 C.F.R. § 1.97, Applicant hereby makes of record the documents listed on the accompanying PTO-1449 Form (1 page) for consideration by the Examiner in connection with the examination of the above-identified patent application.

This Information Disclosure Statement is filed under 37 C.F.R. §1.97 (b), before the mailing date of a First Office Action, therefore no fee is believed due.

I hereby certify that this correspondence and/or documents referred to as attached hereto and/or for are being transmitted to the United States Patent And Trademark Office (703 746 5919) on July 11, 2001.
DAVIDSON, DAVIDSON & KAPPEL, LLC

BY:

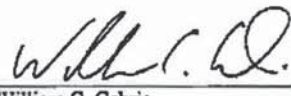

William O'Leary
(Reg No 38,152)

514.1002

In the event any additional fee is due in connection with this response or if any fee has been overpaid, the deficiency or overpayment should be charged to our Deposit Account No. 50-0552.

It is respectfully requested that the references cited in the accompanying PTO-1449 form be considered and made of record. It is respectfully submitted that the pending claims are patentable over all of the references made of record at this time.

Respectfully submitted,
DAVIDSON, DAVIDSON & KAPPEL, LLC

By: 
William C. Gehris
Reg. No. 38,156

DAVIDSON, DAVIDSON & KAPPEL, LLC
485 Seventh Avenue, 14th Floor
New York, New York 10018
(212) 763-1940

JUL 11 2001 2:10PM DDK

NO. 6160 P. 6/15

09/11/02 ^{Sheet 1 of 1}

FORM PTO-1448 (REV. 7-90)		U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE		ATTY. DOCKET NO.: 614.1002		SERIAL NO.: not yet assigned								
LIST OF PRIOR ART CITED BY APPLICANT (See several sheets if necessary)				APPLICANT(S): SHAWERDT										
				FILING DATE: Harwich		GROUP: not yet assigned								
U.S. PATENT DOCUMENTS														
*EXAMINER INITIAL		DOCUMENT NUMBER						DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE		
10	AA	5	8	2	2	1	0	2	10/13/98	Boddeup et al.	959	187		
	AB													
	AC													
	AD													
	AE													
	AF													
	AG													
	AH													
	AI													
	AJ													
	AK													
FOREIGN PATENT DOCUMENTS														
		DOCUMENT NUMBER						DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION		
													YES	NO
	AL													
	AM													
	AN													
	AO													
	AP													
OTHER PRIOR ART (Including Author, Title, Date, Filing Date, Etc.)														
	AR													
	AS													
	AT													
EXAMINER <i>Christina Y. Leung</i>										DATE CONSIDERED <i>6-26-02</i>				
*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.														

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NO. 6167 P. 1

CLIFFORD M. DAVIDSON
LESLIE B. DAVIDSON
CARY S. KAPPEL
WILLIAM C. GEHRIS
MOREY B. WILDES
ROBERT J. PARADISO
ERIK R. SWANSON

THOMAS F. CANTY
LIVIA S. BOYADJIAN

SCOTT L. APPELBAUM
CYNTHIA R. MOORE, PH.D.
DAVID G. KNASIAK
RICHARD V. ZANZALARI
SALVATORE J. MAJORINO
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FROM: William Gehris (Reg No. 38,156) DATE: July 11, 2001
OUR REF: 514.1002 *Wb* NO. OF PAGES (including cover): *2*

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IN THE UNITED STATES PATENT & TRADEMARK OFFICE

Re: Application of: Peter SNAWERDT #5
Serial No.: 09/772,018
Filed: January 29, 2001
For: DUAL-MODE FIBER OPTIC
TELECOMMUNICATIONS SYSTEM AND METHOD

REQUEST FOR CHANGE OF ADDRESS

Commissioner for Patents
Washington, D.C. 20231

July 11, 2001

Sir:

Applicant hereby requests that the correspondence address for the above-referenced application be changed to:

Davidson, Davidson & Kappel, LLC
485 Seventh Avenue, 14th Floor
New York, NY 10018
(212) 736-1940.

Applicant's representative would like to thank the Examiner for noticing the inconsistency in the addresses.

Respectfully submitted,

DAVIDSON, DAVIDSON & KAPPEL, LLC

By William C. Gehris
William C. Gehris (Reg. No. 38,156)

Davidson, Davidson & Kappel, LLC
485 Seventh Avenue, 14th Fl.
New York, New York 10018
(212) 736 1940

I hereby certify that this correspondence and/or documents referred to as attached herein and / or are being transmitted to the United States Patent And Trademark Office (703 746 5919) on July 11, 2001.
DAVIDSON, DAVIDSON & KAPPEL, LLC
BY: William C. Gehris
William C. Gehris (Reg No. 38, 156)

FORM PTO-1083

ASSISTANT COMMISSIONER FOR PATENTS
Washington, DC 20231

Docket No.: 514,1002
Date: July 9, 2001

In re application of: Peter SNAWERDT
Serial No.: 09/772,018
Filed: January 29, 2001
For: DUAL - MODE FIBEROPTIC TELECOMMUNICATIONS SYSTEM AND METHOD

Sir:

Transmitted herewith is a **Supplemental Information Disclosure Statement** in the above-identified application.

- ☐ Small entity status under 37 C.F.R. 1.9 and 1.27 has been previously established.
☐ Applicants assert small entity status under 37 C.F.R. 1.9 and 1.27.
☒ No fee for additional claims is required.
☐ A filing fee for additional claims calculated as shown below, is required:

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JUL 18 2001

Technology Center 2600

(Col. 1)		(Col. 2)	
FOR:	REMAINING	HIGHEST	
	AFTER	PREVIOUSLY	PRESENT
	AMENDMENT	PAID FOR	EXTRA
TOTAL CLAIMS	* Minus**	=	0
INDEP. CLAIMS	* Minus***	=	0
IF 1 FIRST PRESENTATION OF MULTIPLE DEP. CLAIMS			

SMALL ENTITY			OR	LARGE ENTITY		
RATE	FEE			RATE	FEE	
x \$ 9	\$			x \$ 18	\$	
x \$ 40	\$			x \$ 80	\$	
+ \$ 135	\$			+ \$ 270	\$	

TOTAL: \$ OR TOTAL: \$

- * If the entry in Col. 1 is less than the entry in Col. 2, write "0" in Col. 3.
 ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, write "20" in this space.
 *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, write "3" in this space.

- ☒ Also transmitted herewith are:
☐ Petition for extension under 37 C.F.R. 1.136 (in duplicate)
☒ Other: Form PTO -1449 with copies of citations (123 pages)
- ☐ Check(s) in the amount of \$.00 is/are attached to cover:
☐ Filing fee for additional claims under 37 C.F.R. 1.16
☐ Petition fee for extension under 37 C.F.R. 1.136
☐ Other:
- ☐ The Assistant Commissioner is hereby authorized to charge payment of the following fees associated with this communication or credit any overpayment to Deposit Account No. 50-0552.
- ☒ Any filing fee under 37 C.F.R. 1.16 for the presentation of additional claims which are not paid by check submitted herewith.
☒ Any patent application processing fees under 37 C.F.R. 1.17.
☒ Any petition fees for extension under 37 C.F.R. 1.136 which are not paid by check submitted herewith, and it is hereby requested that this be a petition for an automatic extension of time under 37 CFR 1.136.

William C. Gehris
 William C. Gehris, Reg. No. 38,158
 DAVIDSON, DAVIDSON & KAPPEL, LLC
 485 Seventh Avenue, 14th Floor
 New York, New York 10018
 Tel: (212) 736-1940
 Fax: (212) 736-2427

I hereby certify that this correspondence and/or documents referred to as attached therein and/or fee are being deposited with the United States Postal Service as "first class mail" in an envelope addressed to "Assistant Commissioner for Patents, Washington, D.C. 20231" on July 8, 2001.

DAVIDSON, DAVIDSON & KAPPEL, LLC

BY:

Jan Decker

2633



514.1002

UNITED STATES PATENT AND TRADEMARK OFFICE

#7

Examiner: To Be Assigned

Art Unit: 2633

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Re: Application of:

Peter SNAWERDT

JUL 18 2001

Serial No.:

09/772,018

Technology Center 2600

Filed:

January 29, 2001

For:

**DUAL - MODE FIBEROPTIC
TELECOMMUNICATIONS SYSTEM AND
METHOD**

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

Assistant Commissioner for Patents
Washington, D.C. 20231
BOX: NO FEE

July 9, 2001

Sir:

In accordance with the provisions of 37 C.F.R. § 1.97, Applicant hereby makes of record the documents listed on the accompanying PTO-1449 Form (1 page) for consideration by the Examiner in connection with the examination of the above-identified patent application.

This Information Disclosure Statement is filed under 37 C.F.R. §1.97 (b), before the mailing date of a First Office Action, therefore no fee is believed due.

I hereby certify that this correspondence and/or documents referred to as attached therein and / or fee are being deposited with the United States Postal Service as "first class mail" in an envelope addressed to "Assistant Commissioner for Patents, Washington, D.C. 20231" on July 9, 2001.
DAVIDSON, DAVIDSON & KAPPEL, LLC.

BY:

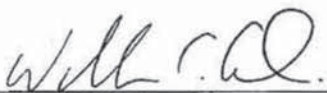

Jan Decker

514.1002

In the event any additional fee is due in connection with this response or if any fee has been overpaid, the deficiency or overpayment should be charged to our Deposit Account No. 50-0552.

It is respectfully requested that the references cited in the accompanying PTO-1449 form be considered and made of record. It is respectfully submitted that the pending claims are patentable over all of the references made of record at this time.

Respectfully submitted,
DAVIDSON, DAVIDSON & KAPPEL, LLC

By: 
William C. Gehris
Reg. No. 38,156

DAVIDSON, DAVIDSON & KAPPEL, LLC
485 Seventh Avenue, 14th Floor
New York, New York 10018
(212) 763-1940



Sheet 1 of 1

FORM PTO-1449
(REV. 7-80)U.S. DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICE

ATTY. DOCKET NO.: 514.1002

SERIAL NO.: 00/772,019

LIST OF PRIOR ART CITED BY APPLICANT

(Use several sheets if necessary)

APPLICANT(S): Peter SNAWERDT

FILING DATE: 01/29/2001

GROUP: 2633

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JUL 18 2001

Technology Center 2400

U.S. PATENT DOCUMENTS

*EXAMINER INITIAL		DOCUMENT NUMBER								DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
cl	AA	5	7	9	3	5	1	2		Aug. 11, 98	Ryo	359	179	
cl	AB	5	8	9	6	2	1	1		Apr. 20, 99	Watanabe	359	124	
cl	AC	6	0	9	7	5	2	5		Aug. 1, 00	Ono et al.	359	181	
cl	AD	6	2	5	8	1	3	0		Jul. 3, 2001	Bilow	359	173	Aug. 28, 1996
cl	AE	5	5	4	3	9	5	2		Aug. 6, 98	Yonenaga et al.	359	181	
	AF													
	AG													
	AH													
	AI													
	AJ													
	AK													

FOREIGN PATENT DOCUMENTS

		DOCUMENT NUMBER								DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION	
														YES	NO
	AL														
	AM														
	AN														
	AO														
	AP														

OTHER PRIOR ART (Including Author, Title, Date, Pertinent Pages, Etc.)

	AR	
	AS	
	AT	

EXAMINER

Christina Y. Sheng

DATE CONSIDERED

6-26-02

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

File History Content Report

The following content is missing from the original file history record obtained from the United States Patent and Trademark Office. No additional information is available.

Document Date - 2001-07-17

Document Title - USPTO Communication Re: Change of Address

This page is not part of the official USPTO record. It has been determined that content identified on this document is missing from the original file history record.



UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
Washington, D.C. 20231
www.uspto.gov

Paper No. **MAIL #6**

DAVIDSON, DAVIDSON & KAPPEL, LLC
485 SEVENTH AVENUE, 14TH FLOOR
NEW YORK, NY 10018

JUL 17 2001

**DIRECTOR OFFICE
TECHNOLOGY CENTER 2600**

In re Application of	:	
Peter Snawerdt	:	DECISION ON PETITION
Application No. 09/772,018	:	TO MAKE SPECIAL
Filed: January 29, 2001	:	
For: DUAL-MODE FIBER OPTIC	:	
TELECOMMUNICATIONS SYSTEM AND METHOD	:	

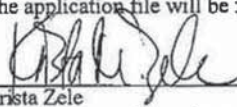
This is a decision on the petition filed June 27, 2001 and supplemental information received by facsimile on July 11, 2001, to make the above-identified application special pursuant to M.P.E.P. § 708.02 (VIII).

In accordance with M.P.E.P. § 708.02, Item VIII, an application may be granted special status provided that the applicant complies with each of the following items: (a) submits a petition to make special accompanied by the fee set forth in 37 C.F.R. § 1.17(I); (b) presents all claims are directed to a single invention, or if the Office determines that all the claims presented are not obviously directed to a single invention, will make an election without traverse as a prerequisite to the grant of special status; (c) submits a statement(s) that a pre-examination search was made, listing of the field of search by class and subclass, publication, Chemical Abstracts, foreign patents, database search with the search terms used, etc.; (d) submits one copy of each of the references deemed most closely related to the subject matter encompassed by the claims if said references are not already of record; and (e) submits a detailed discussion of the references, which discussion points out, with the particularity required by 37 C.F.R. § 1.111(b) and (c), how the claimed subject matter is patentable over the references.

For the above stated reasons, the petition is GRANTED.

The application will retain its special status throughout its entire course of prosecution in the Patent and Trademark Office, including appeal, if any to the Board of Patent Appeals and Interferences, subject only to diligent prosecution by the applicant.

The application file will be forwarded to the examiner for expedited prosecution.



Krista Zele
Special Program Examiner
Technology Center 2600
Communications
(703) 305-4710



COPY OF PAPERS
ORIGINALLY FILED

514.1002

UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Peter SNAWERDT
Serial No.: 09/772,018
Filed: 01/29/2001
For: **DUAL-MODE FIBER OPTIC TELECOMMUNICATIONS
SYSTEM AND METHOD**
Examiner: To Be Assigned
Art Unit: 2633

#8

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MAY 02 2002

Technology Center 2601

SUBMISSION OF FORMAL DRAWINGS

Assistant Commissioner for Patents
Washington, D.C. 200231
BOX PGPUB DRAWINGS

April 19, 2002

Sir:

Submitted herewith are two (2) pages of formal drawings to replace the three (3) sheets of informal drawings that were filed with the above-identified patent application.

Respectfully submitted,

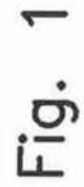
DAVIDSON, DAVIDSON & KAPPEL, LLC

By: William C. Gehris
William C. Gehris
Reg. No. 38,156

DAVIDSON, DAVIDSON & KAPPEL, LLC
Patents, Trademarks and Copyrights
485 Seventh Avenue, 14th Floor
New York, New York 10018
(212) 736-1940

I hereby certify that this correspondence and/or documents referred to as attached therein and / or fee are being deposited with the United States Postal Service as "first class mail" in an envelope addressed to "Assistant Commissioner for Patents, Washington, D.C. 20231" on April 19, 2002.
DAVIDSON, DAVIDSON & KAPPEL, LLC.

BY: Tan Decker
Tan Decker



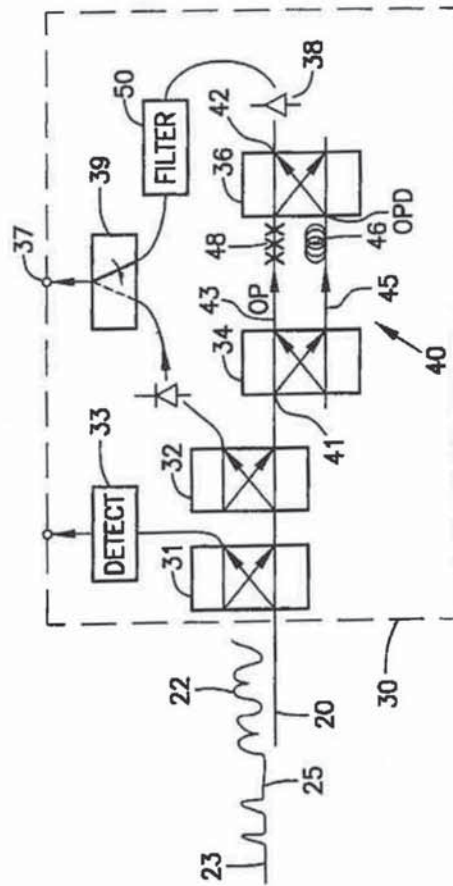


Fig. 2

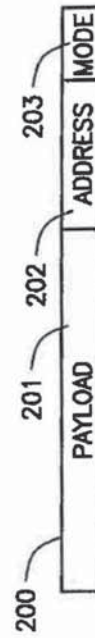


Fig. 3

Applicant: Peter SNAWERDT
Serial No.: 09/772,018
Filed: 01/29/2001
For: DUAL-MODE FIBER OPTIC TELECOMMUNICATIONS
SYSTEM AND METHOD
Attorney's Docket No.: 514.1002
Davidson, Davidson & Kappel, LLC
Contact: William C. Gehris, Reg. No. 38,156
Telephone: (212) 736-1940, ext. 105
Sheet 2 of 2

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5-20-02

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE



Examiner: To Be Assigned

Art Unit: 2633

Application of:

Peter SNAWERDT

Serial No.:

09/772,018

Filed:

January 29, 2001

For:

DUAL-MODE FIBER OPTIC
TELECOMMUNICATIONS SYSTEM AND
METHOD

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SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

Assistant Commissioner for Patents
Washington, D.C. 20231
BOX: NO FEE

May 8, 2002

Sir:

In accordance with the provisions of 37 C.F.R. § 1.97, Applicant hereby makes of record the documents listed on the accompanying PTO-1449 Form (1 page) for consideration by the Examiner in connection with the examination of the above-identified patent application.

This Information Disclosure Statement is filed under 37 C.F.R. §1.97 (b), before the mailing date of a First Office Action, therefore no fee is believed due.

I hereby certify that this correspondence and/or documents referred to as attached therein and / or fee are being deposited with the United States Postal Service as "first class mail" in an envelope addressed to "Assistant Commissioner for Patents, Washington, D.C. 20231" on May 8, 2002.
DAVIDSON, DAVIDSON & KAPPEL, LLC.

BY:

Jan Decker
Jan Decker



514.1002

In the event any additional fee is due in connection with this response or if any fee has been overpaid, the deficiency or overpayment should be charged to our Deposit Account No. 50-0552.

It is respectfully requested that the references cited in the accompanying PTO-1449 form be considered and made of record. It is respectfully submitted that the pending claims are patentable over all of the references made of record at this time.

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Respectfully submitted,

DAVIDSON, DAVIDSON & KAPPEL, LLC

By: W.C. Gehris
William C. Gehris
Reg. No. 38,156

DAVIDSON, DAVIDSON & KAPPEL, LLC
485 Seventh Avenue, 14th Floor
New York, New York 10018
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736-1940

FORM PTO-1449 (REV. 7-80)		U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE		ATTY. DOCKET NO.: 514.1002		SERIAL NO.: 09/772,018	
LIST OF PRIOR ART CITED BY APPLICANT <small>(Use several sheets if necessary)</small>				APPLICANT(S): Peter SNAWERDT			
				FILING DATE: 01/29/2001		GROUP: 2633	
U.S. PATENT DOCUMENTS							
*EXAMINER INITIAL	DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE	
ll	AA 4 7 5 4 4 5 2	Jun. 28, 88	Henry	370	85		
ll	AB 5 9 4 6 1 1 9	Aug. 31, 99	Bergano et al.	359	124		
ll	AC <u>2</u> <u>6</u> <u>3</u> <u>6</u> <u>4</u> <u>3</u> <u>0</u>	Dec. 7, 99	Halbert-Lasalle et al.	370	204		
ll	AD 5 9 4 0 4 5 2	Aug. 17, 99	Rich	375	347		
ll	AE 5 9 2 0 4 1 6	Jul. 6, 99	Beylat et al.	359	181		
ll	AF 5 2 9 1 5 1 6	Mar. 1, 94	Dixon et al.	375	1		
ll	AG 5 2 3 9 3 0 6	Aug. 24, 93	Sivak et al.	340	825.44		
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	DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUB-CLASS	TRANSLATION YES NO	
	AL						
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	AN						
	AO						
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OTHER PRIOR ART (Including Author, Title, Date, Pertinent Pages, Etc.)							
	AR						
	AS						
	AT						
EXAMINER <i>Christina Y. Leung</i>				DATE CONSIDERED <i>6-26-02</i>			
<small>*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.</small>							

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Examiner: To Be Assigned

Art Unit: 2633

Re: Application of:

Peter SNAWERDT

Serial No.:

09/772,018

Filed:

January 29, 2001

For:

**DUAL-MODE FIBER OPTIC
TELECOMMUNICATIONS SYSTEM AND
METHOD**

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Technology Center 2800

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

Assistant Commissioner for Patents
Washington, D.C. 20231
BOX: NO FEE

July 12, 2002

Sir:

In accordance with the provisions of 37 C.F.R. § 1.97, Applicant hereby makes of record the documents listed on the accompanying PTO-1449 Form (1 page) for consideration by the Examiner in connection with the examination of the above-identified patent application.

This Information Disclosure Statement is filed under 37 C.F.R. §1.97 (b), before the mailing date of a First Office Action, therefore no fee is believed due.

I hereby certify that this correspondence and/or documents referred to as attached therein and / or the are being deposited with the United States Postal Service as "first class mail" in an envelope addressed to "Assistant Commissioner for Patents, Washington, D.C. 20231" on July 12, 2002.
DAVIDSON, DAVIDSON & KAPPEL, LLC.

BY:

Jan Decker

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514.1002

In the event any additional fee is due in connection with this response or if any fee has been overpaid, the deficiency or overpayment should be charged to our Deposit Account No. 50-0552.

It is respectfully requested that the references cited in the accompanying PTO-1449 form be considered and made of record. It is respectfully submitted that the pending claims are patentable over all of the references made of record at this time.

Respectfully submitted,
DAVIDSON, DAVIDSON & KAPPEL, LLC

By: William C. Gehris
William C. Gehris
Reg. No. 38,156

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FORM PTO-1449 (REV. 7-90)		U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE		ATTY. DOCKET NO.: 514.1002		SERIAL NO.: 09/772,018	
LIST OF PRIOR ART CITED BY APPLICANT <small>(Use several sheets if necessary)</small>				APPLICANT(S): Peter SNAWERDT		COPY OF PAPER ORIGINALLY FILED	
				FILING DATE: 01/29/2001			
U.S. PATENT DOCUMENTS							
*EXAMINER INITIAL	DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCL ASS	FILING DATE IF APPROPRIATE	
cl	AA 5 9 5 3 4 2 1	Sep. 14, 99	Townsend	380	21		
cl	AB 5 9 5 3 1 3 9	Sep. 14, 99	Nemecsek et al.	359	124		
cl	AC 5 6 2 5 4 7 9	Apr. 29, 97	Suzuki et al.	359	135		
cl	AD 5 7 5 7 9 1 2	May 26, 98	Blow	380	21		
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OTHER PRIOR ART (Including Author, Title, Date, Pertinent Pages, Etc.)							
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	AT						
EXAMINER <i>Christina Y. Leung</i>				DATE CONSIDERED 2-28-03			
<small>*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.</small>							



RS 2633
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514.1002

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Examiner: To Be Assigned

Art Unit: 2633

Re: Application of:

Peter SNAWERDT

Serial No.:

09/772,018

Filed:

January 29, 2001

For:

**DUAL-MODE FIBER OPTIC
TELECOMMUNICATIONS SYSTEM AND
METHOD**

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Technology Center 2600

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

Assistant Commissioner for Patents
Washington, D.C. 20231
BOX: NO FEE

November 15, 2002

Sir:

In accordance with the provisions of 37 C.F.R. § 1.97, Applicant hereby makes of record the documents listed on the accompanying PTO-1449 Form (1 page) for consideration by the Examiner in connection with the examination of the above-identified patent application.

This Information Disclosure Statement is filed under 37 C.F.R. §1.97 (b), before the mailing date of a First Office Action, therefore no fee is believed due.

I hereby certify that this correspondence and/or documents referred to as attached therein and / or fee are being deposited with the United States Postal Service as "first class mail" with sufficient postage in an envelope addressed to "Assistant Commissioner for Patents, Washington, D.C. 20231" on November 15, 2002.
DAVIDSON, DAVIDSON & KAPPEL, LLC.

BY: Jan Desker
Jan Desker

514.1002

In the event any additional fee is due in connection with this response or if any fee has been overpaid, the deficiency or overpayment should be charged to our Deposit Account No. 50-0552.

It is respectfully requested that the references cited in the accompanying PTO-1449 form be considered and made of record. It is respectfully submitted that the pending claims are patentable over all of the references made of record at this time.

Respectfully submitted,

DAVIDSON, DAVIDSON & KAPPEL, LLC

By: 

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FORM PTO-1449
(REV. 7-80)

LIST OF PRIOR ART CITED BY APPLICANT
(Use several sheets if necessary)

U.S. DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICE

ATTY. DOCKET NO.: 514.1002

SERIAL NO.: 09/772,018

APPLICANT(S): Peter SNAWERDT

FILING DATE: 01/29/2001

GROUP: 2633

U.S. PATENT DOCUMENTS

*EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCL ASS	FILING DATE IF APPROPRIATE
cl	AA	6 1 2 4 9 6 0	Sep. 26, 00	Garthe et al.	359	181	
cl	AB	5 3 1 9 4 3 8	Jun. 7, 94	Klasaleh	356	345	
cl	AC	5 5 7 7 0 8 7	Nov. 19, 96	Furuya	375	377	
cl	AD	4 8 2 4 2 0 1	Apr. 25, 89	Kazovsky	380	86.16	
cl	AE	6 1 2 2 0 8 6	Sep. 19, 00	Djupsioebacka	359	181	
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FOREIGN PATENT DOCUMENTS

	DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUB- CLASS	TRANSLATION
						YES NO
	AL					
	AM					
	AN					
	AO					
	AP					

OTHER PRIOR ART (including Author, Title, Date, Pertinent Pages, Etc.)

	AR	
	AS	
	AT	

EXAMINER

Christina Y. Leung

DATE CONSIDERED

7-28-03

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

P



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/772,018	01/29/2001	Peter Sauerdt	514.1002	9221

7590 03/13/2003
DAVIDSON, DAVIDSON & KAPPEL, LLC
485 Seventh Avenue, 14th Floor
New York, NY 10018

EXAMINER

LEUNG, CHRISTINA Y

ART UNIT PAPER NUMBER

2633

DATE MAILED: 03/13/2003

12

Please find below and/or attached an Office communication concerning this application or proceeding.

P

Office Action Summary	Application No.	Applicant(s)	
	09/772,018	SNAWERDT, PETER	
	Examiner	Art Unit	
	Christina Y. Leung	2633	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.135(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 January 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 3, 5-15 and 17-22 is/are rejected.
- 7) ☒ Claim(s) 2, 4 and 16 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 January 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s) _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>2-472-11</u> | 6) <input type="checkbox"/> Other: |

DETAILED ACTION

Drawings

1. This application has been filed with informal drawings which are acceptable for examination purposes only. Formal drawings will be required when the application is allowed.

Claim Rejections - 35 USC § 101

2. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

3. Claim 22 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Claim 22 recites "An optical signal comprising amplitude-modulated signals representative of an input data stream during a first time period and phase-modulated signals representative of the input data stream during a second time period subsequent or prior to the first time period." A signal per se is not statutory subject matter.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 19 and 21 are rejected under 35 U.S.C. 102(e) as being anticipated by Garthe et al. (US 6,124,960 A).

Regarding claim 19, Garthe et al. discloses a method for transmitting optical data in two modes (Figure 5) comprising the steps of:

phase modulating light (with phase modulator 53) from at least one light source (elements 50 and 51) during a first transmission mode so as to transmit phase-modulated optical data; and

amplitude modulating light (with intensity modulator 54) from the at least one light source (elements 50 and 51) during a second alternate transmission mode so as to transmit amplitude-modulated optical data.

Regarding claim 21, Garthe et al. discloses that during the second alternate transmission mode the light is both amplitude-modulated and phase-modulated (column 7, lines 52-67; column 8, lines 1-12).

6. Claims 19 and 21 are rejected under 35 U.S.C. 102(e) as being anticipated by Djupsjobacka (US 6,122,086 A).

Regarding claim 19, Djupsjobacka discloses a method for transmitting optical data in two modes (Figure 1) comprising the steps of:

phase modulating light (with phase modulator 5) from at least one light source 1 during a first transmission mode so as to transmit phase-modulated optical data; and

amplitude modulating light (with amplitude modulator 3) from the at least one light source 1 during a second alternate transmission mode so as to transmit amplitude-modulated optical data.

Regarding claim 21, Djupsjobacka discloses that during the second alternate transmission mode the light is both amplitude-modulated and phase-modulated (abstract).

7. Claims 19 and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Kazovsky (US 4,824,201 A).

Regarding claim 19, Kazovsky discloses a method for transmitting optical data in two modes (Figures 3-5) comprising the steps of:

phase modulating light from at least one light source (with element 32; column 1, lines 54-66) during a first transmission mode so as to transmit phase-modulated optical data; and
amplitude modulating light from the at least one light source (with element 31; column 1, lines 54-66) during a second alternate transmission mode so as to transmit amplitude-modulated optical data.

Regarding claim 21, Kazovsky discloses that during the second alternate transmission mode the light is both amplitude-modulated and phase-modulated.

8. Claim 22 is rejected under 35 U.S.C. 102(b) as being anticipated by Takahashi (US 5,483,370 A).

Regarding claim 22, Takahashi discloses an optical signal comprising amplitude-modulated signals representative of an input data stream during a first time period and phase-modulated signals representative of the input data stream during a second time period subsequent or prior to the first time period (Figure 2; column 1, lines 61-67; column 2, lines 1-6).

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Garthe et al.

Regarding claim 1, Garthe et al. discloses an optical data transmitter (Figure 5) comprising:

at least one light source 50; and

a phase modulator 53 for phase modulating light from the light source.

Garthe et al. further discloses an electronic data stream 55, wherein the phase modulator creates phase-modulated optical signals in the light as a function of the electronic data stream, and an amplitude modulator 54 amplitude-modulates the light as a function of the electronic data stream. It is well known in the art that the data stream disclosed by Garthe et al. would be provided by some source of electrical data signals, although such a source is not explicitly shown in the figure. Garthe et al. do not specifically disclose a controller, but it would be well known in the art that the source of the data stream supplies the data stream in a way which controls the phase modulator and also, as a second mode or function of the device, controls amplitude modulation of the light. It would have been obvious to a person of ordinary skill in the art to include a controller in the transmitter disclosed by Garthe et al. in order to specifically provide a source of the data stream which controls the output of the modulated light.

11. Claims 1, 3, 5-11, 19, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Furuya (US 5,577,087 A) in view of Djupsjobacka.

Regarding claim 1, Furuya discloses a data transmitter (Figure 4) comprising:

a phase modulator 40 for phase modulating a signal;

a controller 90 having an electronic data stream, the controller in a first mode controlling the phase modulator 50 so as to create phase-modulated signals as a function of the electronic

data stream and the controller in a second alternate mode amplitude-modulating signals (via modulator 40) as a function of the electronic data stream.

Furuya does not explicitly disclose that the controller 90 has an input for receiving the data stream, but Furuya does disclose that the controller 90 provides the data to be output to the modulators, and it would be well known in the art that the controller itself likewise would require an input for receiving whatever transmission data is desired by users.

Furuya does not specifically disclose that the signals are optical and does not disclose a light source. However, optical transmitters are generally well known, and it is well known in the art that optical wavelengths may be used as an engineering design choice of a transmission medium instead of the radio frequencies particularly disclosed by Furuya. Djupsjobacka in particular teaches that a light source can provide light to an amplitude modulator and a phase modulator (Figure 1). Regarding claim 9 in particular, Djupsjobacka teaches that the at least one light source may be a single laser which provides light to both modulating devices (Figure 1). Regarding claim 10 in particular, Djupsjobacka also teaches that the laser may be directly adjacent the phase-modulator.

Regarding claims 1, 9, and 10, it would have been obvious to a person of ordinary skill in the art to use optical signals with the system disclosed by Furuya and a light source as suggested by Djupsjobacka in order to provide an optimal choice of signal modulation depending on user requirements in an optical system.

Regarding claim 3, Furuya discloses that the controller in the second mode amplitude modulates the signal in direct relation to the input data stream.

Regarding claim 5, Furuya discloses that the controller has a switch (elements 30 and 50)

for switching between the first and second modes.

Regarding claim 6, Furuya does not specifically disclose that the switch is operator-activated. However, it is well known in the art that such a switch may be controlled manually. It would have been obvious to a person of ordinary skill in the art to specify that the switch is "operator-controlled," either manually or by any other means (such as sending a signal to the switch), in order to allow a user to select between the two detection types as desired.

Regarding claim 7, Furuya discloses that the switch may be bit-data activated (by control signals from controller 90).

Regarding claim 8, Furuya does not specifically disclose that bit data contained in a packet activates the switch, but it is well known in the art that data may be transmitted in packets. It would have been obvious to a person of ordinary skill in the art to control the switch disclosed by Furuya with data contained in a packet as an engineering design choice of a way to format the data signal. The claimed differences exist not as a result of an attempt by Applicants to solve an unknown problem but merely amount to the selection of expedients known as design choices to one of ordinary skill in the art.

Regarding claim 11, Furuya discloses that during the second mode, the phase-modulator provides a constant or no phase-modulation change (Figure 4, which shows that the phase modulator 50 is disconnected when the amplitude modulator 40 is connected.).

Regarding claim 19, Furuya discloses a method for transmitting data in two modes comprising the steps of:

phase modulating signals (with modulator 50) during a first transmission mode so as to transmit phase-modulated data; and

amplitude modulating signals (with modulator 40) during a second alternate transmission mode so as to transmit amplitude-modulated data.

Furuya does not specifically disclose that the signals are optical and does not disclose a light source. However, again, optical transmitters are generally well known, and Djupsjobacka in particular teaches that a light source can provide light to an amplitude modulator and a phase modulator (Figure 1).

It would have been obvious to a person of ordinary skill in the art to use optical signals with the method disclosed by Furuya and a light source as suggested by Djupsjobacka in order to provide an optimal choice of signal modulation depending on user requirements in an optical system).

Regarding claim 20, Furuya discloses that during the first transmission mode the signals are not amplitude-modulated.

12. Claims 12-15 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kazovsky in view of Kiasaleh (US 5,319,438 A)

Regarding claim 12, Kazovsky discloses a receiver for receiving optical signals (Figures 3-5), the optical signals including both phase-modulated optical signals and direct amplitude-modulated optical signals (column 1, lines 54-66), the receiver comprising:

a detector (element 41 in Figure 3 or element 53 in Figure 4) for reading the phase-modulated signals; and

a detector (element 39 in Figure 3 or element 52 in Figure 4) to read the direct amplitude-modulated optical signals (column 3, lines 2-67; column 4, lines 1-37).

Kazovsky does not specifically disclose an interferometer, but Kiasaleh teaches that an

interferometer may be used to receive phase-modulated signals (Figure 2), and it is well known in the art that interferometers may be used to recover information from phase-modulated signals. It would have been obvious to a person of ordinary skill in the art to specifically include an interferometer in one of the detectors in the system disclosed by Kazovsky as an engineering design choice of a way to read the phase-modulated signals Kazovsky already discloses.

Regarding claim 13, Kazovsky discloses a switch 38 for switching between an output of the phase-modulation detector and another output of the amplitude-modulation detector.

Regarding claims 14 and 15, Kazovsky does not specifically disclose how the switch may be controlled, but it is well known in the art that such a switch may be controlled manually or by a data signal. Regarding claim 14 in particular, it would have been obvious to a person of ordinary skill in the art to specify that the switch is "operator-controlled" simply in order to allow a user to select between the two detection types, either manually or by any other means (such as sending a signal to the switch). Regarding claim 15, it would have been obvious to a person of ordinary skill in the art to specify that the switch is bit-data controlled as an engineering design choice of a way to use the switch. The claimed differences exist not as a result of an attempt by Applicants to solve an unknown problem but merely amount to the selection of expedients known as design choices to one of ordinary skill in the art.

13. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kazovsky in view of Kiasaleh as applied to claim 12 above, and further in view of Davis et al. (US 6,215,565 B1).

Regarding claim 17, Kazovsky and Kiasaleh do not specifically disclose an energy level detector, but level detectors are well known in the art for monitoring reception. In particular,

Davis et al. teach an optical communications system including energy level detector (Figure 1, element 37; column 3, lines 44-67). It would have been obvious to a person of ordinary skill in the art to include an energy level detector as taught by Davis et al. in the receiver described by Kazovsky in view of Kiasaleh in order to monitor the reception power and ensure that the receiver is properly connected to the transmitter.

14. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Djupsjobacka, Kazovsky, or Garthe et al., each in view of Kiasaleh.

Regarding claim 18, Kazovsky disclose a transmitter for transmitting amplitude-modulated signals in a first mode (with LED 31; column 1, lines 54-66) and phase-modulated signals in a second mode (with laser 32; column 1, lines 54-66); and

an optical fiber 34 connected to the transmitter.

Djupsjobacka also discloses a dual-mode optical transmission system comprising:

a transmitter (Figure 1) for transmitting amplitude-modulated signals (via amplitude modulator 3) in a first mode and phase-modulated signals (via phase modulator 5) in a second mode; and

an optical fiber connected to the transmitter 15.

Garthe et al. also disclose a dual-mode optical transmission system (Figure 5) comprising:

a transmitter for transmitting amplitude-modulated signals in a first mode (with amplitude modulator 54) and phase-modulated signals in a second mode (with phase modulator 53); and

an optical fiber (such as element 501) connected to the transmitter.

Kazovsky, Djupsjobacka, and Garthe et al. each further disclose a receiver in their respective systems for receiving the signals (Kazovsky, element 35; Djupsjobacka, element 25; Garthe et al., element 505), but none specifically disclose that the receiver has an interferometer.

However, it is well known in the art that interferometers may be used to recover information from phase-modulated signals. Again, Kiasaleh in particular teaches an optical receiver which includes an interferometer for detecting phase-modulated signals (Figure 2). It would have been obvious to a person of ordinary skill in the art to include an interferometer in the receiver disclosed by Kazovsky, Djupsjobacka, or Garthe et al. in order to demodulate and properly recover the phase-modulated signals.

Allowable Subject Matter

15. Claims 2, 4, and 16 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Regarding claims 2 and 4, although Garthe et al. and Furuya in view of Djupsjobacka describe systems as discussed with regard to claim 1, they do not specifically suggest that the controller phase modulates or amplitude modulates light as a function of an output of a delayed-feedback exclusive-or gate having the electronic data stream as an input.

Regarding claim 16, although Kazovsky discloses a receiver which receives amplitude-modulated or phase-modulated signals as discussed with regard to claim 12, and Kiasaleh teaches using an interferometer to read phase-modulated signals, Kiasaleh does not specifically suggest that such an interferometer may receive delayed amplitude-modulated optical signals.

Application/Control Number: 09/772,018
Art Unit: 2633


Page 12

Conclusion

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christina Y. Leung whose telephone number is 703-605-1186. The examiner can normally be reached on Monday to Friday, 6:30 to 3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on 703-305-4729. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-4700.


JASON CHAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600

Notice of References Cited	Application/Control No. 09/772,018	Applicant(s)/Patent Under Reexamination SNAWERDT, PETER	
	Examiner Christina Y. Leung	Art Unit 2833	Page 1 of 1

U.S. PATENT DOCUMENTS

* A	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
	US-5,483,370 A	01-1996	Takahashi, Yasushi	359/128
	US-6,215,565 B1	04-2001	Davis et al.	359/110
	US-			
	US-			
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FOREIGN PATENT DOCUMENTS

* A	Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N				
	O				
	P				
	Q				
	R				
	S				
	T				

NON-PATENT DOCUMENTS

* A	Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U
	V
	W
	X

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

U.S. Patent and Trademark Office
PTO-892 (Rev. 01-2001)

Notice of References Cited

Part of Paper No. 12

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FORM PTO-1083

COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, VA 22313-1450

In re application of: Peter SNAWERT
Serial No.: 09/772,018
Filed: 01/29/2001
For: DUAL-MODE FIBER OPTIC TELECOMMUNICATIONS SYSTEM AND METHOD

Sir:

Transmitted herewith is a Response to Office Action (10 pgs, total fax pages with this cover 11) in the above-identified application.

- ☐ Small entity status under 37 C.F.R. 1.9 and 1.27 has been previously established.
☐ Applicants assert small entity status under 37 C.F.R. 1.9 and 1.27.
☒ No fee for additional claims is required.
☐ A filing fee for additional claims calculated as shown below, is required:

FOR:	(col. 1)		(col. 2)		SMALL ENTITY			LARGE ENTITY		
	REMAINING	HIGHEST	PREVIOUSLY	PRESENT	RATE	FEE	OR	RATE	FEE	
	AFTER			EXTRA						
	AMENDMENT		PAYD FOR							
TOTAL CLAIMS	* MINUS**	=	0							
INDEP. CLAIMS	* MINUS***	=	0							
IF 1 FIRST PRESENTATION OF MULTIPLE DEP. CLAIMS										

TOTAL: \$ 00 TOTAL: \$

- * If the entry in Col. 1 is less than the entry in Col. 2, write "0" in Col. 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, write "20" in this space.
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, write "3" in this space.

- ☐ Also transmitted herewith are:
☐ Petition for extension under 37 C.F.R. 1.138 (in duplicate)
☐ Other:
☐ Check(s) in the amount of \$00 is/are attached to cover:
☐ Filing fee for additional claims under 37 C.F.R. 1.16
☐ Petition fee for extension under 37 C.F.R. 1.138
☐ Other:
☒ The Assistant Commissioner is hereby authorized to charge payment of the following fees associated with this communication or credit any overpayment to Deposit Account No. 50-0652.
☒ Any filing fee under 37 C.F.R. 1.16 for the presentation of additional claims which are not paid by check submitted herewith.
☒ Any patent application processing fees under 37 C.F.R. 1.17.
☒ Any petition fees for extension under 37 C.F.R. 1.138 which are not paid by check submitted herewith, and it is hereby requested that this be a petition for an automatic extension of time under 37 CFR 1.135.

William C. Gehris
William C. Gehris, Reg. No. 38,156
DAVIDSON, DAVIDSON & KAPPEL, LLC
485 Seventh Avenue, 14th Floor
New York, New York 10018
Tel: (212) 736-1840
Fax: (212) 736-2427

I hereby certify that this correspondence and/or documents referred to as attached therein and/or fee are being facsimile transmitted to the United States Patent and Trademark Office (Facsimile number for TC 2800 before final actions (703) 872-0314) on June 11, 2003.

BY: *William C. Gehris*
William Gehris (Reg. No. 38,156)

NO. 5277 P. 1
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Official

6-11-03

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

#13/a
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7/2/03

Re: Application of: Peter SNAWERDT
Serial No.: 09/772,018
Filed: January 29, 2001
For: DUAL-MODE FIBER OPTIC TELECOMMUNICATIONS
SYSTEM AND METHOD
Examiner: Christina Leung
Art Unit: 2633

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

June 11, 2003

RESPONSE TO OFFICE ACTION

In response to the office action dated March 13, 2003, applicant requests reconsideration of the present application in view of the following amendments and remarks:

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6-11-03 JL

IN THE CLAIMS

Claim 1 (currently amended) An optical data transmitter comprising:
at least one light source a laser;
a phase modulator for phase modulating light from the light source; and
a controller having an input for receiving an electronic data stream, the controller in a first mode controlling the phase modulator so as to create phase-modulated optical signals in the light from the laser as a function of the electronic data stream and the controller in a second alternate mode amplitude-modulating the light from the laser as a function of the electronic data stream, the first mode and the second mode occurring at different times.

10.

Claim ~~1~~ (amended): An optical data transmitter comprising:

a light source;

a phase modulator for phase modulating light from the light source; and

a controller having an input for receiving an electronic data stream, the controller in a first mode controlling the phase modulator so as to create phase-modulated optical signals in the light from the light source as a function of the electronic data stream and the controller in a second alternate mode amplitude-modulating the light from the light source as a function of the electronic data stream; The transmitter as recited in claim 1 wherein the controller in the first mode preferably phase-modulates the light as a function of an output of a delayed-feedback exclusive-or gate having the electronic data stream as an input.

2.

Claim ~~1~~ (original): The transmitter as recited in claim 1 wherein the controller in the second mode amplitude modulates the light in direct relation to the input data stream.

3.

Claim ~~1~~ (original): The transmitter as recited in claim 1 wherein the controller in the second mode amplitude modulates the light as a function of an output of a delayed-feedback exclusive-or gate having the electronic data stream as an input.

4. 514.1002
Claim ~~3~~ (original): The transmitter as recited in claim 1 wherein the controller has a switch for switching between the first and second modes.

5. 4
Claim ~~6~~ (original): The transmitter as recited in claim ~~3~~ wherein the switch is operator-activated.

6. 4
Claim ~~7~~ (original): The transmitter as recited in claim 1 wherein the switch is bit-data activated.

7. 6
Claim ~~8~~ (original): The transmitter as recited in claim ~~7~~ wherein bit data contained in a packet activates the switch.

Claim 9 (cancelled).

8. 1
Claim ~~10~~ (currently amended): The transmitter as recited in claim-9 ~~1~~ wherein the laser is directly adjacent the phase-modulator.

9. 1
Claim ~~11~~ (original): The transmitter as recited in claim 1 wherein during the second mode the phase-modulator provides a constant or no phase-modulation change.

11. 1
Claim ~~12~~ (currently amended): A receiver for receiving optical signals, the optical signals including both phase-modulated optical signals and direct amplitude-modulated optical signals, the receiver comprising:

an interferometer for reading the phase-modulated signals; and
a detector to read the direct amplitude-modulated optical signals;
wherein the interferometer receives delayed amplitude-modulated optical signals.

12. 11
Claim ~~13~~ (original): The receiver as recited in claim ~~12~~ further comprising a switch for switching between an output of the interferometer and another output of the detector.

13. 12
Claim ~~14~~ (original): The receiver as recited in claim ~~13~~ wherein the switch is operator-controlled.

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¹⁴
Claim ¹²~~15~~ (original): The receiver as recited in claim ~~13~~ wherein the switch is bit-data controlled.

Claim 16 (cancelled).

¹⁵
Claim ¹¹~~17~~ (original): The receiver as recited in claim ~~12~~ further comprising an energy level detector for measuring light energy in a fiber.

¹⁶
Claim ¹⁶~~18~~ (currently amended): A dual-mode optical transmission system comprising:
a transmitter having a laser for transmitting amplitude-modulated signals in a first mode and phase-modulated signals in a second mode and a controller for switching an output of the laser between the first mode and the second mode, the second mode occurring at a different time than the first mode;
an optical fiber connected to the transmitter; and
a receiver having an interferometer being connected to the optical fiber.

¹⁷
Claim ¹⁷~~19~~ (currently amended): A method for transmitting optical data in two modes comprising the steps of:

phase modulating light from at least one light source a laser during a first transmission mode so as to transmit phase-modulated optical data; and
amplitude modulating light from the at least one light source laser during a second alternate transmission mode so as to transmit amplitude-modulated optical data, the second alternate transmission mode occurring at a time separate from the first transmission mode.

¹⁸
Claim ¹⁷~~20~~ (original): The method as recited in claim ~~19~~ wherein during the first transmission mode the light is not amplitude-modulated.

¹⁹
Claim ¹⁷~~21~~ (original): The method as recited in claim ~~19~~ wherein during the second alternate transmission mode the light is both amplitude-modulated and phase-modulated.

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Claim 22 (cancelled).

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REMARKS

Claim 22 was rejected under 35 U.S.C. 101 and 35 U.S.C. 102(b). Claims 19 and 21 were rejected under 35 U.S.C. 102(e) as being anticipated by Garthe or Djupsjobacka. Claim 19 and 21 were rejected under 35 U.S.C. § 102(b) as being anticipated by Kazovsky. Claim 1 was rejected under 35 U.S.C. 103 as being unpatentable over Garthe. Claims 1, 3, 5 to 11, 19 and 20 were rejected under 35 U.S.C. 103 as unpatentable over Furuya in view of Djupsjobacka. Claims 12 to 15 and 17 were rejected under 35 U.S.C. 103. Claim 18 was rejected under 35 U.S.C. 103 as being unpatentable over Djupsjobacka, Kazovsky or Garthe in view of Kiasaleh.

Claims 1, 2, 12, 18 and 19. Claims 9 and 22 have been canceled without prejudice.

Withdrawal of the rejections is respectfully requested.

Claim 22 rejections

Claim 22 has now been canceled without prejudice, and withdrawal of the 35 U.S.C. 101 and 102 rejections is respectfully requested.

Claims 1 to 11

Claim 1 has been amended to recite the laser limitation of claim 9, which was rejected as unpatentable over Furuya in view of Djupsjobacka. (Garthe does not show a laser for two alternate modes, but rather two different wavelengths at the same time being modulated). Claim 1 also has been amended to clarify that the second mode occurs at a different point in time than the first mode.

Furuya discloses a digital radio communication system where either an AM or a PSK method can be used for transmission, which is used depending on the location of a base station from terminals. (See Furuya at col. 2, line 63 et seq., for example). The switching depends on radio reception quality through the air.

Djupsjobacka discloses simultaneous transmission of optical signals in AM or PM mode, the same signal being sent in AM and PM mode at the same time. (See for example Djupsjobacka at column 2, lines 50 to 54).

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It is respectfully submitted that neither Furuya nor Djupsjobacka discloses "a controller having an input for receiving an electronic data stream, the controller in a first mode controlling the phase modulator so as to create phase-modulated optical signals in the light from the laser as a function of the electronic data stream and the controller in a second alternate mode amplitude-modulating the light from the laser as a function of the electronic data stream, the first mode and the second mode occurring at different times."

It is respectfully submitted that one of skill in the art would not have modified Furuya with a laser, as the whole disclosure of Furuya is dedicated to solving problems related to bad radio transmissions. Moreover, Djupsjobacka is concerned with improving an optical signal which is totally irrelevant to the Furuya device and also transmits AM and PM signals at exactly the same time, and not in two different time modes, as now claimed.

Withdrawal of the rejection to claim 1 and its remaining dependent claims is respectfully requested.

Claim 2, indicated as allowable, has been rewritten in independent form and is respectfully submitted as allowable.

Claims 12 to 17

Claim 12 has been amended to include the limitations of allowable claim 16, and withdrawal of the rejection to claim 12 and its dependent claims is respectfully requested.

Claim 18

Claim 18 was rejected under 35 U.S.C. 103 as being unpatentable over Djupsjobacka, Kazovsky or Garthe in view of Kiasaleh.

Claim 18 now recites a transmitter having a laser for transmitting amplitude-modulated signals in a first mode and phase-modulated signals in a second mode and a controller for switching an output of the laser between the first mode and the second mode, the second mode occurring at a different time than the first mode.

Neither Djupsjobacka, Kazovsky, Garthe nor Kiasaleh shows such different time modes for modulating one laser. Djupsjobacka shows simultaneous AM/PM transmission. Kazovsky shows an LED transmission mode at the same time as a laser transmission mode, and thus a laser

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is not modulated in two time distinct modes. Garthe shows simultaneous transmission at two different wavelengths. Kiasaleh does not show two modes.

Withdrawal of the rejection to claim 18 is respectfully requested.

Claims 19 to 21

Claims 19 and 21 were rejected under 35 U.S.C. 102(e) as being anticipated by Garthe or Djupsjobacka. Claims 19 and 21 were rejected under 35 U.S.C. § 102(b) as being anticipated by Kazovsky. Claims 19 and 20 were rejected under 35 U.S.C. 103 as unpatentable over Furuya in view of Djupsjobacka.

Claim 19 now recites a method for transmitting optical data in two modes comprising the steps of:

phase modulating light from a laser during a first transmission mode so as to transmit phase-modulated optical data; and

amplitude modulating light from the laser during a second alternate transmission mode so as to transmit amplitude-modulated optical data, the second alternate transmission mode occurring at a time separate from the first transmission mode.

Neither Djupsjobacka, Kazovsky, Garthe nor Furuya shows such different time modes for modulating one laser. Djupsjobacka shows simultaneous AM/PM transmission. Kazovsky shows an LED transmission mode at the same time as a laser transmission mode, and thus a laser is not modulated in two time distinct modes. Garthe shows simultaneous transmission at two different wavelengths. Furuya teaches distinct modes for a digital radio sender and is concerned with radio transmission problems due to poor reception, and not to laser transmissions.

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Specification

It is noted that the specification cites in several places a cop-pending and co-owned application, which is U.S. Serial No. 09/765,153. This case has been allowed and the issue fee paid, and is assigned to Examiner David Payne in the same art unit as the present application. Once the patent number is assigned, the Examiner is invited by Examiner's Amendment to amend the specification by replacing the patent application references by the Patent Number. Applicant can also make this change if the Examiner so desires.

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CONCLUSION

It is respectfully submitted that the application is in condition for allowance and applicant respectfully requests such action.

Respectfully submitted,

DAVIDSON, DAVIDSON & KAPPEL, LLC

By: W C C
William C. Gehris
Reg. No. 38,156

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Patents, Trademarks and Copyrights
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New York, New York 10018
(212) 736-1940

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FORM PTO-1083

COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, VA 22313-1450



Docket No.: 514,1002
Date: June 12, 2003

\$2633

In re application of: **Peter SNAWERDT**
Serial No.: 09/772,018
Filed: January 29, 2001
For: **DUAL-MODE FIBER OPTIC TELECOMMUNICATIONS SYSTEM AND METHOD**

Sir:

Transmitted herewith is an **Supplemental Information Disclosure Statement w/ PTO 1449 Form and Cited References** in the above-identified application.

RECEIVED

JUN 18 2003

Technology Center 2600

- ☐ Small entity status under 37 C.F.R. 1.9 and 1.27 has been previously established.
☐ Applicants assert small entity status under 37 C.F.R. 1.9 and 1.27.
☒ No fee for additional claims is required.
☐ A filing fee for additional claims calculated as shown below, is required:

(Col. 1)		(Col. 2)		SMALL ENTITY		OR	LARGE ENTITY	
FOR:	REMAINING	HIGHEST	PRESENT	RATE	FEE		RATE	FEE
	AFTER	PREVIOUSLY						
	AMENDMENT	PAID FOR	EXTRA					
TOTAL CLAIMS	* Minus**	=	0	x \$ 9	\$		x \$ 18	\$
INDEP. CLAIMS	* Minus***	=	0	x \$ 40	\$		x \$ 80	\$
[] FIRST PRESENTATION OF MULTIPLE DEP. CLAIM				+ \$135			+ \$270	

TOTAL: \$ OR TOTAL: \$

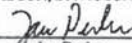
- * If the entry in Co. 1 is less than the entry in Col. 2, write "0" in Col. 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, write "20" in this space.
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, write "3" in this space.

- ☐ Also transmitted herewith are:
☐ Petition for extension under 37 C.F.R. 1.136
☐ Other:
- ☒ Check(s) in the amount of \$180.00 is/are attached to cover:
☐ Filing fee for additional claims under 37 C.F.R. 1.16
☐ Petition fee for extension under 37 C.F.R. 1.136
☒ Other: IDS Fee under 37 C.F.R. 1.17(p)
- ☒ The Assistant Commissioner is hereby authorized to charge payment of the following fees associated with this communication or credit any overpayment to Deposit Account No. 50-0552.
- ☒ Any filing fee under 37 C.F.R. 1.16 for the presentation of additional claims which are not paid by check submitted herewith.
- ☒ Any patent application processing fees under 37 C.F.R. 1.17.
- ☒ Any petition fees for extension under 37 C.F.R. 1.136 which are not paid by check submitted herewith, and it is hereby requested that this be a petition for an automatic extension of time under 37 CFR 1.136.


William C. Gehris, Reg. No. 38,156
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485 Seventh Avenue, 14th Floor
New York, New York 10018
Tel: (212) 736-1940
Fax: (212) 736-2427

I hereby certify that the documents referred to as attached therein and/or fee are being deposited with the United States Postal Service as "first class mail" with sufficient postage in an envelope addressed to "Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450" on June 12, 2003.
DAVIDSON, DAVIDSON & KAPPEL, LLC

BY:


Jan Decker



14/Supp ID 54/4
b7m 723-2

514.1002

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Re: Application of:	Peter SNAWERDT	RECEIVED
Serial No.:	09/772,018	JUN 18 2003
Filed:	01/29/2001	Technology Center 2600
For:	DUAL-MODE FIBER OPTIC TELECOMMUNICATIONS SYSTEM AND METHOD	

Examiner: Leung, Christina Y. Art Unit: 2633

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

June 12, 2003

Sir:

In accordance with the provisions of 37 C.F.R. § 1.97, Applicant hereby makes of record the documents listed on the accompanying PTO-1449 Form (1 page) for consideration by the Examiner in connection with the examination of the above-identified patent application. While the references are being submitted herewith some or all may not qualify as prior art under the U.S. patent laws.

This Information Disclosure Statement is filed under 37 C.F.R. §1.97 (c)(2).

Herewith respectfully submitted is a check in the amount of \$180.00 in accordance with 37 C.F.R. § 1.17 (p).

In the event any additional fee is due in connection with this response or if any fee has been overpaid, the deficiency or overpayment should be charged to our Deposit Account No. 50-0552.

06/17/2003 WRSFAM1 00000025 09772018

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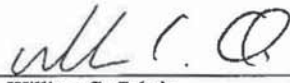
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514.1002

It is respectfully requested that the references cited in the accompanying PTO-1449 form be considered and made of record. It is respectfully submitted that the pending claims are patentable over all of the references made of record at this time.

Respectfully submitted,

DAVIDSON, DAVIDSON & KAPPEL, LLC

By: 
William C. Gehris
Reg. No. 38,156

DAVIDSON, DAVIDSON & KAPPEL, LLC
485 Seventh Avenue, 14th Floor
New York, New York 10018
(212) 736-1940

FORM PTO-1449 (REV. 7-80)		U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE		ATTY. DOCKET NO.: 514.1002		SERIAL NO.: 09772,018	
LIST OF PRIOR ART CITED BY APPLICANT (Use several sheets if necessary)				APPLICANT(S): Peter SNAWERDT			
				FILING DATE: 01/29/2001		GROUP: 2633	
U.S. PATENT DOCUMENTS							
*EXAMINER INITIAL		DOCUMENT NUMBER		DATE	NAME	CLASS	SUBCL ASS
	AA						
	AB						
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FOREIGN PATENT DOCUMENTS							
		DOCUMENT NUMBER		DATE	COUNTRY	CLASS	SUB- CLASS
							TRANSLATION
							YES
							NO
ll	AL	0	6	0	5	3	9
							04
							Feb. 25, 94
							JP - Japan
ll	AM	0	9	7	7	3	8
							2
							Feb. 2, 00
							EP - Europe
	AN						
	AO						
	AP						
OTHER PRIOR ART (Including Author, Title, Date, Pertinent Pages, Etc.)							
	AR						
	AS						
	AT						
EXAMINER <i>Christina Y. Luong</i>				DATE CONSIDERED <i>9-4-03</i>			
*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.							

Notice of Allowability	Application No.	Applicant(s)
	09/772,018	SNAWERDT, PETER
	Examiner	Art Unit
	Christina Y. Leung	2633

— The MAILING DATE of this communication appears on the cover sheet with the correspondence address—

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

- ☒ This communication is responsive to amendment and response filed 11 June 2003.
- ☒ The allowed claim(s) is/are 1-8, 10-15 and 17-21.
- ☒ The drawings filed on 29 April 2002 are accepted by the Examiner.
- ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - ☐ All
 - ☐ Some*
 - ☐ None of the:
 - ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

- ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- ☐ The translation of the foreign language provisional application has been received.
- ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application. **THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

- ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
- ☐ CORRECTED DRAWINGS must be submitted.
 - ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - ☐ hereto or 2) ☐ to Paper No. _____.
 - ☐ including changes required by the proposed drawing correction filed _____, which has been approved by the Examiner.
 - ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No. _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet.

- ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1 <input type="checkbox"/> Notice of References Cited (PTO-892)	2 <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)
3 <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)	4 <input type="checkbox"/> Interview Summary (PTO-413), Paper No. _____
5 <input checked="" type="checkbox"/> Information Disclosure Statements (PTO-1449), Paper No. <u>14</u>	6 <input type="checkbox"/> Examiner's Amendment/Comment
7 <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit of Biological Material	8 <input type="checkbox"/> Examiner's Statement of Reasons for Allowance
	9 <input type="checkbox"/> Other

Leslie Pascal
LESLIE PASCAL
PRIMARY EXAMINER



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

7590 09/09/2003
DAVIDSON, DAVIDSON & KAPPEL, LLC
485 Seventh Avenue, 14th Floor
New York, NY 10018

EXAMINER	
LEUNG, CHRISTINA Y	
ART UNIT	CLASS-SUBCLASS
2633	398-185900

DATE MAILED: 09/09/2003

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/772,018	01/29/2001	Peter Snaewerd	514.1002	9221

TITLE OF INVENTION: DUAL-MODE FIBER OPTIC TELECOMMUNICATIONS SYSTEM AND METHOD

APPL. TYPE	SMALL ENTITY	ISSUE FEE	PUBLICATION FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	\$650	\$300	\$950	12/09/2003

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE REFLECTS A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE APPLIED IN THIS APPLICATION. THE PTOL-85B (OR AN EQUIVALENT) MUST BE RETURNED WITHIN THIS PERIOD EVEN IF NO FEE IS DUE OR THE APPLICATION WILL BE REGARDED AS ABANDONED.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status is changed, pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above and notify the United States Patent and Trademark Office of the change in status, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check the box below and enclose the PUBLICATION FEE and 1/2 the ISSUE FEE shown above.

☐ Applicant claims SMALL ENTITY status.
See 37 CFR 1.27.

II. PART B - FEE(S) TRANSMITTAL should be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). Even if the fee(s) have already been paid, Part B - Fee(s) Transmittal should be completed and returned. If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

Page 1 of 4

PTOL-85 (Rev. 08/03) Approved for use through 04/30/2004.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: **Mail** Mail Stop ISSUE FEE
Commissioner for Patents
Alexandria, Virginia 22313-1450
or Fax (703) 746-4000

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 4 should be completed where appropriate. All further correspondence including the Patent, advance order and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Legibly mark-up with any corrections or use Block 1)
 7590 09/09/2003

DAVIDSON, DAVIDSON & KAPPEL, LLC
 485 Seventh Avenue, 14th Floor
 New York, NY 10018

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission
 I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/772,018	01/29/2001	Peter Sawerdt	514.1002	9221

TITLE OF INVENTION: DUAL-MODE FIBER OPTIC TELECOMMUNICATIONS SYSTEM AND METHOD

APPLN. TYPE	SMALL ENTITY	ISSUE FEE	PUBLICATION FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	\$650	\$300	\$950	12/09/2003

EXAMINER	ART UNIT	CLASS-SUBCLASS
LEUNG, CHRISTINA Y	2633	398-185000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. Use of a Customer Number is required.

2. For printing on the patent front page, list (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1. _____
 2. _____
 3. _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. Inclusion of assignee data is only appropriate when an assignment has been previously submitted to the USPTO or is being submitted under separate cover. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY AND STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ individual ☐ corporation or other private group entity ☐ government

4a. The following fee(s) are enclosed:

- ☐ Issue Fee
☐ Publication Fee
☐ Advance Order - # of Copies _____

4b. Payment of Fee(s):

- ☐ A check in the amount of the fee(s) is enclosed.
☐ Payment by credit card. Form PTO-2038 is attached.
☐ The Director is hereby authorized by charge the required fee(s), or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

Director for Patents is requested to apply the Issue Fee and Publication Fee (if any) or to re-apply any previously paid issue fee to the application identified above.

(Authorized Signature)

(Date)

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, Alexandria, Virginia 22313-1450.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

TRANSMIT THIS FORM WITH FEE(S)

PTOL-85 (Rev. 08/03) Approved for use through 04/30/2004.

OMB 0651-0033

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE



UNITED STATES PATENT AND TRADEMARK OFFICE

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United States Patent and Trademark Office
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P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/772,018	01/29/2001	Peter Sawwardt	514.1002	9221
7590 09/09/2003 DAVIDSON, DAVIDSON & KAPPEL, LLC 485 Seventh Avenue, 14th Floor New York, NY 10018			EXAMINER LEUNG, CHRISTINA Y	
			ART UNIT	PAPER NUMBER
			2633	

DATE MAILED: 09/09/2003

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 344 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 344 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) system (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (703) 305-1383. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at (703) 305-8283.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/772,018	01/29/2001	Peter Snaverd	514.1002	9221
<div style="display: flex; justify-content: space-between;"> 7590 09/09/2003 </div>				
DAVIDSON, DAVIDSON & KAPPEL, LLC 485 Seventh Avenue, 14th Floor New York, NY 10018			<div style="border: 1px solid black; padding: 2px; text-align: center;">EXAMINER</div> LEUNG, CHRISTINA Y	
			<div style="border: 1px solid black; padding: 2px; text-align: center;">ART UNIT</div> 2633	<div style="border: 1px solid black; padding: 2px; text-align: center;">PAPER NUMBER</div>
DATE MAILED: 09/09/2003				

Notice of Fee Increase on October 1, 2003

If a reply to a "Notice of Allowance and Fee(s) Due" is filed in the Office on or after October 1, 2003, then the amount due will be higher than that set forth in the "Notice of Allowance and Fee(s) Due" since there will be an increase in fees effective on October 1, 2003. See Revision of Patent Fees for Fiscal Year 2004; Final Rule, 68 Fed. Reg. 41532, 41533, 41534 (July 14, 2003).

The current fee schedule is accessible from (<http://www.uspto.gov/main/howtofees.htm>).

If the fee paid is the amount shown on the "Notice of Allowance and Fee(s) Due" but not the correct amount in view of the fee increase, a "Notice of Pay Balance of Issue Fee" will be mailed to applicant. In order to avoid processing delays associated with mailing of a "Notice of Pay Balance of Issue Fee," if the response to the Notice of Allowance is to be filed on or after October 1, 2003 (or mailed with a certificate of mailing on or after October 1, 2003), the issue fee paid should be the fee that is required at the time the fee is paid. If the issue fee was previously paid, and the response to the "Notice of Allowance and Fee(s) Due" includes a request to apply a previously-paid issue fee to the issue fee now due, then the difference between the issue fee amount at the time the response is filed and the previously-paid issue fee should be paid. See Manual of Patent Examining Procedure, Section 1308.01 (Eighth Edition, August 2001).

Effective October 1, 2003, 37 CFR 1.18 is amended by revising paragraphs (a) through (c) to read as set forth below.

Section 1.18 Patent post allowance (including issue) fees.

- (a) Issue fee for issuing each original or reissue patent, except a design or plant patent:
- By a small entity (Sec. 1.27(a))..... \$665.00
 - By other than a small entity..... \$1,330.00
- (b) Issue fee for issuing a design patent:
- By a small entity (Sec. 1.27(a))..... \$240.00
 - By other than a small entity..... \$480.00
- (c) Issue fee for issuing a plant patent:
- By a small entity (Sec. 1.27(a))..... \$320.00
 - By other than a small entity..... \$640.00

Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at (703) 305-8283.

BEST COPY



PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: **Mail Stop ISSUE FEE**
Commissioner for Patents
Alexandria, Virginia 22313-1450
 or **Fax** (703) 746-4000

INSTRUCTIONS: This form should be used for transmitting the **ISSUE FEE** and **PUBLICATION FEE** (if required). Blocks 1 through 4 should be completed where appropriate, and further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Must Legibly retype with any current one or use Block 1)
 7990 09/09/2003

DAVIDSON, DAVIDSON & KAPPEL, LLC
 485 Seventh Avenue, 14th Floor
 New York, NY 10018

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission
 I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO, on the date indicated below.

Jan Decker (Depositor's name)
Jan Decker (Signature)
 9/23/2003 (Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/772,018	01/29/2001	Peter Sawers	514.1002	9221

TITLE OF INVENTION: DUAL-MODE FIBER OPTIC TELECOMMUNICATIONS SYSTEM AND METHOD

APPL. TYPE	SMALL ENTITY	ISSUE FEE	PUBLICATION FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	\$650	\$300	\$950	12/09/2003

EXAMINER	ART UNIT	CLASS-SUBCLASS
LEUNG, CHRISTINA Y	2633	398-185000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.303).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" indication form PTO/SB/147; Rev 03-02 or more recent) attached. Use of a Customer Number is required.

2. For printing on the patent front page, list (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1. Davidson, Davidson & Kappel, LLC

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. Inclusion of assignee data is only appropriate when an assignment has been previously submitted to the USPTO or is being submitted under separate cover. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE (CITY AND STATE OR COUNTRY)

OYSTER OPTICS, INC.

New York, NY

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ individual ☒ corporation or other private group entity ☐ government

4a. The following fee(s) are enclosed:

☒ Issue Fee

☒ Publication Fee

☒ Advance Order - # of Copies 10

4b. Payment of Fee(s):

☒ A check in the amount of the fee(s) is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☒ The Director is hereby authorized by charge the required fee(s), or credits any overpayment, to Deposit Account Number 0000062 (enclose an extra copy of this form).

Director for Patents is requested to apply the Issue Fee and Publication Fee (if any) or to re-apply any previously paid issue fee to the application identified above.

William C. Gehris, Reg. No. 38,156

(Authorized Signature)

(Date) 9/23/2003

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant, a registered attorney or agent, or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to be used by the USPTO to process an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and reviewing the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, Alexandria, Virginia 22313-1450.

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09/30/2003 HAUW62 0000062 09772018

01 FC:1504	300.00 DP
02 FC:2501	650.00 DP
03 FC:18001	30.00 DP

TRANSMIT THIS FORM WITH FEE(S)

PTOL-85 (Rev. 08/03) Approved for use through 04/30/2004.

OMB 0651-0033

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

File History Content Report

The following content is missing from the original file history record obtained from the United States Patent and Trademark Office. No additional information is available.

Document Date - 2003-12-16

Document Title - USPTO Grant

This page is not part of the official USPTO record. It has been determined that content identified on this document is missing from the original file history record.



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P75M

DAVIDSON, DAVIDSON & KAPPEL, LLC
485 Seventh Avenue, 14th Floor
New York NY 10018

DATE PRINTED

06/27/07

MAINTENANCE FEE REMINDER

According to the records of the U.S. Patent and Trademark Office (USPTO) the maintenance fee for the patent(s) listed below (for which the above address is on record as the fee address under 37 CFR 1.363) has not been paid within the six-month period set forth in 37 CFR 1.362(d). THE MAINTENANCE FEE MAY STILL BE PAID WITH THE APPLICABLE SURCHARGE SET FORTH IN 37 CFR 1.20(h), WITHIN THE SIX-MONTH GRACE PERIOD SET FORTH IN 37 CFR 1.362(e).

Unless payment of the maintenance fee and the applicable surcharge is received in the USPTO within the six-month grace period, THE PATENT WILL EXPIRE AS OF THE END OF THE GRACE PERIOD. 35 U.S.C. 41(b).

The total payment due is the amount required on the date the fee is paid (and not necessarily the amount indicated below). All USPTO fees (including maintenance fees) are subject to change. Customers should refer to the USPTO Web site (www.uspto.gov) or call the Maintenance Fee Branch at 571-272-6500 for the most current fee amounts for the correct entity status before submitting payment. The total payment due indicated below is based on the entity status according to current Office records (shown below).

Timely payment of the total payment due is required in order to avoid expiration of the patent. A maintenance fee payment can be timely made using the certificate of mailing or transmission procedure set forth in 37 CFR 1.8.

PATENT NUMBER	FEE MAINT. AMT SURCHG	U.S. APPL NUMBER	PATENT ISSUE DATE	APPL. FILING DATE	PAY- MENT SMALL YEAR ENTITY?	TOTAL ATTORNEY PYMT DOCKET DUE NUMBER
6665500	450 65	09772018	12/16/03	01/29/01	4 YES	515 514.1002

The maintenance fee and the applicable surcharge can be paid quickly and easily over the Internet at www.uspto.gov by electronic funds transfer (EFT), credit card, or USPTO deposit account payment methods. The mailing address for all maintenance fee payments not electronically submitted over the Internet is: United States Patent and Trademark Office, P.O. Box 371611, Pittsburgh, PA 15250-1611.

Direct any questions about this notice to: Mail Stop M Correspondence, Director of the United States Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450.

NOTE: This notice was automatically generated based on the amount of time that elapsed since the date a patent was granted. It is possible that the patent term may have ended or been shortened due to a terminal disclaimer that was filed in the application. Also, for any patent that issued from an application filed on or after June 8, 1995 containing a specific reference to an earlier filed application or applications under 35 U.S.C. 120, 121, or 365(c), the patent term ends 20 years from the date on which the earliest such application was filed, unless the term was adjusted or extended under 35 U.S.C. 154 or 156. Patentee should determine the relevant patent term for a patent before paying the maintenance fee.

MF440H (3/2008)

File History Content Report

The following content is missing from the original file history record obtained from the United States Patent and Trademark Office. No additional information is available.

Document Date - 2012-01-10

Document Title - USPTO Communication Re: Power of Attorney

This page is not part of the official USPTO record. It has been determined that content identified on this document is missing from the original file history record.

File History Content Report

The following content is missing from the original file history record obtained from the United States Patent and Trademark Office. No additional information is available.

Document Date - 2012-01-10

Document Title - USPTO Communication Re: Change of Address

This page is not part of the official USPTO record. It has been determined that content identified on this document is missing from the original file history record.

File History Content Report

The following content is missing from the original file history record obtained from the United States Patent and Trademark Office. No additional information is available.

Document Date - 2015-06-01

Document Title - Applicant Communication Re: Entity Status Set to Undiscounted
(Initial Default Setting or Status Change)

This page is not part of the official USPTO record. It has been determined that content identified on this document is missing from the original file history record.

PATENT APPLICATION FEE DETERMINATION RECORD

Effective October 1, 2000

Application or Docket Number

09/17298

CLAIMS AS FILED - PART I

	(Column 1)	(Column 2)
TOTAL CLAIMS	22	
FOR	NUMBER FILED	NUMBER EXTRA
TOTAL CHARGEABLE CLAIMS	22 minus 20 = *	2
INDEPENDENT CLAIMS	5 minus 3 = *	2
MULTIPLE DEPENDENT CLAIM PRESENT <input type="checkbox"/>		

* If the difference in column 1 is less than zero, enter "0" in column 2

CLAIMS AS AMENDED - PART II

	(Column 1)	(Column 2)	(Column 3)
AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
Total	*	Minus **	=
Independent	*	Minus ***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <input type="checkbox"/>			

	(Column 1)	(Column 2)	(Column 3)
AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
Total	*	Minus **	=
Independent	*	Minus ***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <input type="checkbox"/>			

	(Column 1)	(Column 2)	(Column 3)
AMENDMENT C	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
Total	*	Minus **	=
Independent	*	Minus ***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM <input type="checkbox"/>			

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20."

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3."

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

SMALL ENTITY TYPE ☐ OR

OTHER THAN SMALL ENTITY

RATE	FEE	RATE	FEE
BASIC FEE	355.00	BASIC FEE	710.00
X\$ 9=	18	X\$18=	
X40=	80	X80=	
+135=		+270=	
TOTAL	453	TOTAL	

SMALL ENTITY OR

OTHER THAN SMALL ENTITY

RATE	ADDITIONAL FEE	RATE	ADDITIONAL FEE
X\$ 9=		X\$18=	
X40=		X80=	
+135=		+270=	
TOTAL ADDIT. FEE		TOTAL ADDIT. FEE	

RATE	ADDITIONAL FEE	RATE	ADDITIONAL FEE
X\$ 9=		X\$18=	
X40=		X80=	
+135=		+270=	
TOTAL ADDIT. FEE		TOTAL ADDIT. FEE	

RATE	ADDITIONAL FEE	RATE	ADDITIONAL FEE
X\$ 9=		X\$18=	
X40=		X80=	
+135=		+270=	
TOTAL ADDIT. FEE		TOTAL ADDIT. FEE	

CLAIMS ONLY							SERIAL NO. 09/772 018	FILING DATE
							APPLICANT(S)	
CLAIMS								
	AS FILED		AFTER 1st AMENDMENT		AFTER 2nd AMENDMENT			
	IND.	DEP.	IND.	DEP.	IND.	DEP.	*	*
1							51	
2							52	
3							53	
4							54	
5							55	
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44							94	
45							95	
46							96	
47							97	
48							98	
49							99	
50							100	
TOTAL IND.	5						TOTAL IND.	
TOTAL DEP.	17						TOTAL DEP.	
TOTAL CLAIMS	22						TOTAL CLAIMS	

* MAY BE USED FOR ADDITIONAL CLAIMS OR ADMENDMENTS

FORM PTO-2022 (1-98)

U.S. DEPARTMENT OF COMMERCE
Patent and Trademark Office

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Search results for: pns=(US6665500);

Collections searched: DWPI, US Granted, Australian Innovation, Canadian Applications, US Applications, Australian Granted, French Granted, French Applications, European Granted, Australian Applications, German Utility Models, European Applications, British Applications, British Granted, German Granted, WIPO Applications, Canadian Granted, German Applications, Russian Utility Models, Russian Applications, Chinese Utility Models, Indonesian Simple, Korean Utility Models, Singaporean Applications, Chinese Granted, Indonesian Applications, Korean Granted/Examined, Thai Granted/Examined, Chinese Applications, Japanese Utility Models, Korean Applications, Vietnamese Granted, Indian Granted, Japanese Granted, Malaysian Granted, Vietnamese Applications, Indian Applications, Japanese Applications, Singaporean Granted, Argentinean Utility Models, Argentinean Applications, Mexican Granted, Brazilian Utility Models, Mexican Applications, Brazilian Granted, Brazilian Applications, Other Authorities

Table of Contents

1. US6665500B2 Dual-mode fiber optic telecommunications system and method
-

Family 1/1**1 record(s) per family****Record 1/1** US6665500B2 Dual-mode fiber optic telecommunications system and method**Publication Number:** US6665500B2 20031216**Title:** Dual-mode fiber optic telecommunications system and method**Title - DWPI:** Optical data transmitter for fiber optic communication, performs phase or amplitude modulation of optical signal as a function of received electronic data stream, when operating in phase or amplitude modulation mode**Priority Number:** US2001772018A**Priority Date:** 2001-01-29**Application Number:** US2001772018A**Application Date:** 2001-01-29**Publication Date:** 2003-12-16**IPC Class Table:**

IPC	Section	Class	Subclass	Class Group	Subgroup
H04B001012	H	H04	H04B	H04B0010	H04B001012
H04B0010152	H	H04	H04B	H04B0010	H04B0010152

IPC Class Table - DWPI:

IPC - DWPI	Section - DWPI	Class - DWPI	Subclass - DWPI	Class Group - DWPI	Subgroup - DWPI
H04B0010152 (IPC 1-7)	H	H04	H04B	H04B0010	H04B0010152 (IPC 1-7)
H04B001012 (IPC 1-7)	H	H04	H04B	H04B0010	H04B001012 (IPC 1-7)
H04B0010155 (IPC 1-7)	H	H04	H04B	H04B0010	H04B0010155 (IPC 1-7)
H04B001012	H	H04	H04B	H04B0010	H04B001012
H04B0010152	H	H04	H04B	H04B0010	H04B0010152

Assignee/Applicant: Oyster Optics Inc., New York, NY

JP F Terms:

JP FI Codes:

Assignee - Original: Oyster Optics Inc.

Any CPC Table:

Type	Invention	Additional	Version	Office
Current	H04B 10/85	-	20130101	EP
Current	H04B 10/548		20130101	EP

ECLA: H04B001085 | H04B0010152

Abstract:

An optical data transmitter includes at least one light source, a phase modulator for phase modulating light from the light source, and a controller having an input for receiving an electronic data stream, the controller in a first mode controlling the phase modulator so as to create phase-modulated optical signals in the light as a function of the electronic data stream and the controller in a second alternate mode amplitude-modulating the light as a function of the electronic data stream. A dual-mode receiver, an optical data transmission system and a dual-mode optical signal are also disclosed.

Language of Publication: EN

INPADOC Legal Status Table:

Gazette Date	Code	INPADOC Legal Status Impact
2016-08-12	AS	-
Description: ASSIGNMENT OYSTER OPTICS, LLC, SOUTH CAROLINA ASSIGNMENT OF ASSIGNORS INTEREST; ASSIGNOR:TQ GAMMA, LLC; REEL/FRAME:039415/0120 2016-07-15		
2015-06-02	FPAY	+
Description: FEE PAYMENT FEE PAYMENT YEAR 12		
2011-11-18	AS	-
Description: ASSIGNMENT TQ GAMMA, LLC, TEXAS ASSIGNMENT OF ASSIGNORS INTEREST; ASSIGNOR:OYSTER OPTICS, INC.; REEL/FRAME:027250/0335 2011-11-15		
2011-06-16	FPAY	+
Description: FEE PAYMENT FEE PAYMENT YEAR 8		

2007-10-31	SULP	+
Description: SURCHARGE FOR LATE PAYMENT		
2007-10-31	FPAY	+
Description: FEE PAYMENT FEE PAYMENT YEAR 4		
2007-06-27	REMI	-
Description: MAINTENANCE FEE REMINDER MAILED		
2003-11-25	STCF	-
Description: INFORMATION ON STATUS: PATENT GRANT PATENTED CASE		
2001-01-29	AS	-
Description: ASSIGNMENT OYSTER OPTICS, INC., NEW YORK ASSIGNMENT OF ASSIGNORS INTEREST; ASSIGNOR: SNAWERDT, PETER; REEL/FRAME: 011491/0559 2001-01-25		

Post-Issuance (US):

Reassignment (US) Table:

Assignee	Assignor	Date Signed	Reel/Frame	Date
OYSTER OPTICS LLC, MURRELLS INLET, SC, US	TQ GAMMA, LLC	2016-07-15	039415/0120	2016-08-12
Conveyance: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).				
Corresponent: BRUCE K. LAGERMAN PO BOX 249 MURRELLS INLET, SC 29576				
TQ GAMMA LLC, AUSTIN, TX, US	OYSTER OPTICS, INC.	2011-11-15	027250/0335	2011-11-18
Conveyance: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).				
Corresponent: WILLIAM C. GEHRIS 485 SEVENTH AVENUE, 14TH FLOOR DAVIDSON, DAVIDSON & KAPPEL, LLC NEW YORK, NY 10018				
OYSTER OPTICS INC., NEW YORK, NY, US	SNAWERDT, PETER	2001-01-25	011491/0559	2001-01-29
Conveyance: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).				
Corresponent: DAVIDSON, DAVIDSON & KAPPEL, LLC WILLIAM C. GEHRIS 485 SEVENTH AVENUE 14TH FLOOR NEW YORK, N.Y. 10018				



United States Patent and Trademark Office

Office of the Commissioner for Patents

DUAL-MODE FIBER OPTIC TELECOMMUNICATIONS SYSTEM AND METHOD

PATENT # 6665500 APPLICATION # 09772018 FILING DATE 01/29/2001 ISSUE DATE 12/16/2003

Payment Window Status

WINDOW STATUS FEES
11.5 Year Closed Paid

No maintenance
fees are due.

Window	First Day to Pay	Surcharge Starts	Last Day to Pay	Status	Fees
3.5 Year	12/16/2006	06/19/2007	12/17/2007	Closed	Paid
7.5 Year	12/16/2010	06/17/2011	12/16/2011	Closed	Paid
11.5 Year	12/16/2014	06/17/2015	12/16/2015	Closed	Paid

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